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APPLETON'S NEW PRACTICAL CYCLOPEDIA

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APPLETON'S NEW PRACTICAL CYCLOPEDIA

A NEW WORK OF REFERENCE
BASED UPON THE BEST AUTHORITIES, AND SYSTEMATICALLY
ARRANGED FOR USE IN HOME AND SCHOOL

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KEY TO PRONUNCIATION

ā, as in *fate.*
ă, as in *fat.*
â, as in *fall.*
ä, as in *father.*
ǟ, as in *welfare.*

ē, as in *meet.*
ĕ, as in *met.*
ė, as in *her* and *eu* in French *-eur.*

ī, as in *five.*
ĭ, as in *it.*

ō, as in *sober.*
ŏ, as in *not.*
ȯ, as in *fool* or *spoon*, or as *u* in *rule.*
ō̆, as in *foot.*
ȯ, as in *Göthe* and *eu* in French *neuf.*

ū, as in *mule.*
ŭ, as in *but.*
ü, produced with lips rounded to utter *oo* and tongue placed as in uttering *e.*
ů, as in *burn* or *burg.*

ch, as in German *ich.*

kh, as *ch* in German *nacht* and Scotch *loch*, and as *g* in German *tag.*

th, as in *thin.*

th, as in *though.*

ṅ, French nasal *n* and *m*; pronounce *ang*, *ong*, *ung*, etc., in usual way, but without sounding the *g.*

ñ, Spanish n-y, as in cañon; French and Italian —gn, as in Boulogne.

APPLETON'S

NEW PRACTICAL CYCLOPEDIA

VOLUME III

Gates, Sir Thomas, d. abt. 1621; English colonial governor; sailed from England in charge of a colony of 500 emigrants to the New World, 1609; his vessel was stranded on the rocks of Bermuda, where the passengers built two new ships and reached Virginia, May, 1610. Gates went to England and returned, 1611, with 300 more emigrants; was governor when he returned to England.

Gath, one of the five chief cities of Philistia, mentioned in the history of David and his successors. It was often under the Jewish kings; site now considered most probable is Tel es-Safieh, 10 m. SE. of Ashdod, and 22 m. SW. of Jerusalem.

Gat'i (Sanskrit, "path," "way," or "course"), in Buddhism, the six ways or forms of sentient existence through which living beings pass in the round of transmigration: (1) *gods*; (2) *men*; (3) *asuras*, or demons, whose abode is beneath Mt. Meru; (4) *animals*; (5) *prêtas*, or hungry ghosts, tall, attenuated beings whose mouth is no bigger than the eye of a needle, and who are afflicted with an unquenchable thirst. They wander about incessantly and weep for a whole kalpa. (6) Beings who suffer in hell for periods proportioned to their demerits.

Gatineau (gă-tē-nō'), river in Quebec, Canada; principal affluent of the Ottawa, which it enters opposite Ottawa city; has valuable water power; its banks heavily timbered.

Gat'ling, Richard Jordan, 1818–1903; American inventor; b. Hertford Co., N. C.; invented and patented a machine for sowing rice, which, 1844, he adapted to sowing wheat in drills; then studied medicine; 1849, engaged in business at Indianapolis; 1850, invented a double-acting hemp brake; 1857, a steam plow; 1861, conceived the idea of the revolving battery gun which bears his name; made his first gun at Indianapolis, 1862, and afterwards devoted himself to its perfection. The gun was adopted by the U. S. Govt. for use with troops and for the flank defense of fortifications. It has also been adopted by Russia, Great Britain, etc. He also patented a gun metal composed of steel and aluminum.

Gauchos (gow'chōz), name given to the peasantry of mixed Indian and white race, who form a large portion of the country population in the Platine states of S. America, especially Uruguay. They always go mounted, and, being accustomed to horses from their infancy, are splendid riders. In the civil wars of their countries the Gauchos have been prominent. They care little for political questions, but are ready to follow any leader who gives them a roving life and plunder.

Gaudeamus (gâ-dē-ā'mŭs), "let us rejoice," song of great antiquity based on a Latin college song, dating prior to 1267; the present version, as sung by American and German students dates from 1781. It urges the enjoyment of youth and life, the opening line being "Gaudeamus igitur, juvenes dum sumus" (Let us therefore rejoice while we are young).

Gauden'tius, name of nearly thirty ancient Christian bishops, two of whom were especially noted. GAUDENTIUS, (abt. 360–427 A.D.), Bishop of Brescia, in N. Italy, a friend of Ambrose and Chrysostom; before becoming a bishop (abt. 387 A.D.) he traveled in the East, whence he brought back the relics of nearly forty saints. GAUDENTIUS, Donatist Bishop of Thamugada, in N. Africa, of whose personal history very little is known, first came into notice at the famous conference in Carthage, 411. It was against him that Augustine wrote his last works in the Donatistic controversy, 420 A.D.

Gaugamela (gâ-gă-mē'lă), a village in province of Aturia, Assyria, at which Alexander the Great routed the army of Darius. By some it is placed nearly midway between the mouth of the Upper Zab and Eski-Kelek, the ferry of the modern caravan road between Mosul and Erbil; by others at Kermelis, nearly midway between Mosul and Eski-Kelek.

Gauge (gāj), a standard or measure, as the Whitworth gauge for screws, or the width between railway tracks now made uniform between the different roads, so that the cars of one line may travel over the tracks of another. This railroad gauge has varied from 2 ft. to 7 ft. In the U. S., Great Britain, and many other countries, it is now fixed at 4 ft. 8½ in.

Gaul, Alfred Robert, 1837– ; English composer; b. Norwich; composer of cantatas and songs. His "Ruth," "Holy City," "Passion Service," "Joan of Arc," "The Ten Virgins,"

"Israel in the Wilderness," "Song of Life," and "Una" were written for ordinary choral societies and good church choirs, and have been highly successful.

Gaul. See GALLIA.

Gauls. See CELTS.

Gault, originally a provincial name for a stratum of stiff blue lime clay or marl occurring in several localities in the S. and E. of England, but now accepted as a geological term to designate a statigraphical horizon in the Cretaceous formation of Europe.

Gaulthe'ria, a genus of shrubs, mostly very small, found in N. and S. America, Asia, Australia, etc. The typical species is the *Gaultheria procumbens*, the wintergreen or checkerberry of the U. S. and Canada. Its fruit and young leaves are edible, and abound in the oil of wintergreen, a fragrant volatile oil used in pharmacy and confectionery. Oil of gaultheria is a source of salicylic acid, and is often used in the treatment of rheumatism.

Gaunt, John of. See JOHN OF GAUNT.

Gaunt'let, in armor, the part protecting the hand; usually composed of leather covered by iron scales. To throw down the gauntlet was a form of challenge accepted by the person

GAUNTLET.

who picked it up. The gauntlet, which dates from the twelfth century, gave way in the fifteenth century to the mitten of steel, which had no separate parts for the fingers.

Gaur (gowr). See GOUR.

Gaur (gâr), wild ox found in Assam, Madras Presidency, and other parts of India; a powerful animal, a full-grown bull standing 5 ft. 6 in. at the shoulders; forehead wide and concave; horns strong, much curved, and from 2 ft. to 2 ft. 6 in. long. The color is deep brown or blackish, legs white below the knees.

Gauss (gows), **Karl Friedrich,** 1777–1855; German mathematician; b. Brunswick. His "Disquisitiones Arithmeticæ," 1801, gave him at once a distinguished place among scientific men. From 1807–55, Prof. of Mathematics and Director of the Observatory at Göttingen. He introduced improvements in geodesy, invented the heliotrope, and devised a method for the correction of errors in extensive triangulation; after 1831, employed his leisure principally in the investigation of magnetism, inventing the magnetometer for ascertaining the variations of the magnetic needle. As a mathematician he was pronounced by Laplace the greatest in Europe.

Gau'tama, or **Go'tama,** properly the name of the great Solar race of E. Indian warrior princes, but more especially the name of Sakyamuni, otherwise called Gautama Buddha, the alleged founder of Buddhism, 624–543 B.C.; son of Suddhôdana, king of Kapilavastu, in the N. of India, and in youth was called Siddhârta. In early life he was of ascetic habits, till, tempted by his father, he abandoned himself to every pleasure for a time; but his singular wisdom (which, like his other marvelous gifts, was the fruit of merits gained in previous states of existence) led him to renounce the world, and after years of profound study, severe bodily maceration, and long contemplation, he discovered the supreme truth that to return to the ignorance and state of nonsentient repose whence man sprang is the highest possible good and the final reward of the just and pure. After this discovery he was made a buddha, and after a time passed into Nirvana, or unconsciousness, having died at Kusinagara. His body was burned, but numerous relics of him were preserved and became objects of veneration. The Brahmans teach that he was the ninth *avatar* of Vishnu, sent to delude and destroy the Asura race. See BUDDHA.

Gautier (gō-tē-a'), **Théophile,** 1811–72; French author; b. Tarbes; tried, without success, to become an artist; 1830, published a volume of poems, and from that time took position as a Parisian *littérateur* of the romantic school; was 1836–56 art critic and dramatic censor for the *Presse*; literary editor of the *Moniteur Universel*, 1856; of the *Journal Officiel*, 1869; author of "Albertus," poem, some pleasant books of travel, many good novels, and other works, among which are "Les grotesques," "Trésors d'art de la Russie," "Histoire de l'art dramatique en France," 6 vols., 1859, with several poems, librettos, and many fugitive pieces.

Gauze, light fabric of silk or silk and cotton, woven so loosely and with such delicate threads as to be transparent. Since the introduction of antiseptic methods in surgery much antiseptic gauze, or gauze impregnated with certain drugs, is used. It is believed to take its name from *Gaza*, in Palestine, where it was once made. Switzerland, France, and Scotland chiefly produce it. The name is also given to other light fabrics, such as the woolen or silk-and-woolen material used for underwear. Fine wire cloth is called wire gauze.

Gavarni (gä-vär-nē'), name assumed by SULPICE GUILLAUME PAUL CHEVALIER, 1801–66; French artist; b. Paris; first published sketches of the valley of Gavarnie in the Pyrenees, whence his pseudonym; attained fame by his humorous delineations of Parisian life, exposing the foibles of good society, as well as the eccentricities of low life; also illustrated several books, among them Sue's "Wandering Jew."

Gavarnie (gä-vär-nē'), **Cascade' de,** a waterfall in the Cirque de Gavarnie, Pyrenees; second highest cataract in Europe; 1,385 ft.

Gavazzi (gä-vät'sē), **Alessandro,** 1809–89; Italian preacher; b. Bologna; joined the Order of the Barnabites, 1825; was afterwards Prof. of Rhetoric at Naples; took part in the revolution of 1848; was chaplain in chief of the Republican army at Rome, but after the French occupation of that city went to England and the U. S., where he lectured against the Roman Govt. and Church. In 1860 he accompanied Garibaldi to Sicily; 1870, founded the Free Christian Church of Italy, and, 1875, its theological seminary in Rome, where he was Prof. of Dogmatics, Apologetics, and Polemics; 1873, solicited funds in the U. S. for the maintenance of his church; published his "Life, Sermons, and Lessons."

Gav'elkind, a tenure in England by which the estate descends, not to the eldest son, as by common law, but to all the sons, or, if there be no sons, to all the brothers. It prevailed throughout Kent, but is seldom met with in other counties. The best authorities believe that this was the general custom of England before the Norman conquest.

Gav'eston, Piers. See EDWARD II.

Gavia (gā'vi-ē), an order or suborder of birds containing the gulls, the equivalent of the superfamily *Laroideæ* of Stejnegor, or the order *Longipennes* minus the petrels (*Tubinares*).

Ga'vial, or Na'koo, a peculiar species of crocodile (*Gavialis gangeticus*) characterized by long, narrow jaws, inhabiting some of the rivers of India, especially the upper Ganges and its tributaries. The male has a large cartilaginous lump upon the snout, in which the nostrils open. The teeth, though numerous and sharp, are slender, and although the gavial sometimes attains a length of 20 ft., it is doubtful if it ever attacks a man.

GAVIAL.

Gavot', in music, a gay and spirited dance tune, written in common time. It has two strains, each of which is repeated, the latter being usually the longer. The gavot was familiar in the seventeenth century and later, and often appears in connection with the minuet—as, *e.g.*, in the forty-eight sonatas of Corelli.

Gay, Claude, 1800–63; French naturalist; b. Draguignan; traveled in Greece and the East; went to Chile, 1828, and studied the botany, zoölogy, and meteorology of that country and other parts of S. America; after return to Paris, 1842, published in Spanish, at the expense of the Chilean Govt., a physical and political history of Chile, 24 vols., 1843–51, with an atlas in 2 vols., 4to. He went to Russia and Tartary, 1856–58, and then studied mines in the U. S.

Gay, Delphine, 1804–55; French poet and novelist; b. Aix-la-Chapelle; daughter of Sophie Gay and wife of Émile de Girardin; won a prize with a poem when fifteen and a royal pension with another at twenty; poems include "Sisters of St. Camille," "the Vision of Joan of Arc," and "The Widow of Nain"; novels, "Lorgnon," "Le Marquis de Pontanges," and "Balzac's Cane."

Gay, John, 1685–1732; English poet; b. Devonshire; published "Rural Sports," 1711, which won him Pope's favor; 1712, secretary to the Duchess of Marlborough, and, 1714, secretary to Clarendon, then ambassador to Hanover; acquired wealth, but lost it in the South Sea Bubble; author of several successful dramas, some fine ballads, such as "Black-eyed Susan," and other poems, like "The Shepherd's Week," and "Trivia," remarkable for wit; "Fables" and "The Beggar's Opera" are especially noteworthy.

Gay, Sydney Howard, 1814–88; American author; b. Hingham, Mass.; gave up the study of law because of his opposition to slavery; became an antislavery lecturer and editor of the *Antislavery Standard*; managing editor of New York *Tribune*, 1862–66, and Chicago *Tribune*, 1868–71. In 1874 arranged with William Cullen Bryant to produce an illustrated history of the U. S. Mr. Bryant wrote the preface, and Mr. Gay, with collaborators on certain chapters, wrote the history, 4 vols., 1876–81.

Gay'al, a variety of the domestic ox; found in parts of Bengal and Farther India, where it is reared in great herds for its hide and flesh; it gives rich but scanty milk.

Gayarré (gī-ä-rā'), **Charles Étienne Arthur,** 1805–95; American lawyer and historian; b. New Orleans; admitted to the bar, 1829; member of Louisiana Legislature several times; Deputy Attorney General, 1831; presiding Judge New Orleans City Court, 1833; U. S. Senator, 1835, but prevented by illness from taking his seat; Secretary of State of Louisiana, 1846–53; chief works, "History of Louisiana," in French; "Romance of the History of Louisiana"; "Louisiana, its Colonial History and Romance"; "Louisiana, its History as a French Colony"; "History of the Spanish Domination in Louisiana"; "Philip II of Spain"; "Fernando de Lemos," a novel, and "The School for Politics," a drama.

Gay-Lussac (gā-lü-säk'), **Joseph Louis,** 1778–1850; French chemist; b. St. Leonard; became assistant professor at the Polytechnic School; commissioned with Biot to experiment upon the diminution of magnetic force at great elevations. Two balloon ascensions were made, the first, August 23, 1804, by both, and the second, September 15th, by Gay-Lussac alone. In the latter he reached the extraordinary height of 23,000 ft. In 1805–6 he prosecuted, with Humboldt, scientific inquiries in France, Switzerland, Germany, and Italy. He began, 1807, to investigate the expansion of gases under increased temperatures, and established the law that when free from moisture they all dilate uniformly and to equal amounts for all

equal increments of temperature, at least between zero and 100° C. He also showed that the gases combine in simple proportions of their volumes. He introduced many new methods of analysis, and invented valuable instruments, including the siphon barometer, alcoholometer, chlorometer, and alkalimeter. In 1832 he gave up the professorship at the Sorbonne, to which he had been appointed, 1809, and accepted that of general chemistry at the Jardin des Plantes. In 1839 he became a peer.

Gaza (gā'zä), **Theodorus,** abt. 1400–78; Greek scholar; b. Thessalonica; left that town on its capture by the Turks, 1430; rector and Prof. of Greek in the Gymnasium of Ferrara; employed, 1450–56, by Pope Nicholas V, and, 1456–58, by Alfonso the Magnanimous of Naples. His Greek grammar (1495) was long famous. His letters, Greek treatise on the calendar, and translations from Latin to Greek and Greek to Latin contributed largely to the revival of letters in Italy.

Gaza (gā'zä), strongest of the five royal cities of the Philistines; in the SW. of Palestine; was the limit of the conquest under Joshua; with Damascus, it is one of the oldest cities in the world, and still one of the chief cities in Palestine. Commanding the road to Egypt, it has been the scene of repeated and desperate struggles. Samson's exploits made it famous (Judg. xvi). It was captured by Alexander the Great after a siege of nearly five months; 634 it fell to the Saracens, and since the battle of Hattin, 1187, has remained Mohammedan. Gaza is now about 2 m. from the Mediterranean, nearly the whole space between it and the sea being covered with ruins. Pop. abt. 35,000.

Gaz'el, or **Ghaz'el,** kind of lyric poem common among the Turks and Persians, of from five to seventeen stanzas of two lines each, all the second lines of which rhyme. The subject is generally erotic or allegorical.

Gazelle', common name of the *Gazella dorcas* and the nearly allied species, antelopes of

COMMON GAZELLE.

Africa and Asia. The ariel gazelle of Asia is a more graceful variety of the same species. The gazelles are celebrated for their elegant forms and the beauty of their eyes. They are easily tamed, and become great favorites from the gentleness of their disposition.

Gazetteer', a geographical dictionary; a work containing some account of civil and natural divisions in geography, of mountains, rivers, lakes, seas, etc., arranged in alphabetical order. Gazetteers often are local or national, but there are many, more or less complete, which describe places in all parts of the world. See CYCLOPEDIA; DICTIONARY.

Gear'ing, or **Wheel'work,** a train of wheels, usually toothed, by means of which continuous rotation is communicated from one revolving axis to another. Frictional gearing, however, is that kind of wheelwork in which motion is transmitted from one wheel to another by the mere contact of the rims of the wheels. In this system it is convenient to have one of the contact surfaces (preferably that of the driver) covered by some softer material than the contact surface of the other. If the latter is of cast iron, the former will be either of wood, leather, rubber, or paper. In frictional gearing it is necessary that the smooth faces of the wheels shall be constantly pressed together. Circular V-shaped grooves and projections have been often turned upon the faces of cast-iron wheels to make the friction more effective. Teeth are generally provided, however, which, by interlocking, render the slipping of one circumference upon another impossible. Wheelwork usually receives a special designation, depending on the relative positions of the axes of the wheels. When the axes are parallel, it is called *spur gearing*; when the axes intersect, *bevel gearing*; and when the axes are not parallel and do not intersect, *skew bevel* and *screw gearing*. One of the most important requirements in wheelwork, and a primary consideration, is that smooth and continuous motion shall be communicated from the driver to the follower. In a train of wheelwork where spur wheels are employed and the axes parallel, the ratio of the numbers of revolutions of the first and last wheels may be found by multiplying the numbers of teeth in all the drivers for a numerator, and of all the followers for a denominator. The resulting ratio will be that of the number of revolutions of the first wheel divided by the number of revolutions of the last wheel.

Geber (gā'bẽr), **Abu-Musa Ja'far al-Sufi,** d. abt. 776; considered by many authorities as the father of chemistry; b. Arabia; credited with numerous writings showing familiarity with a large number of chemical apparatus and processes in common use later and with various branches of metallurgy.

Geck'o, a name given to numerous thick-tongued nocturnal lizards of the family *Geckotidæ*, in imitation of their cry. There are about 100 species, among which the *Ptyodactylus gecko* of Africa (whose footsteps were thought to be the cause of the leprosy, and which was considered able to eat steel) and the *Gecko verus* of Asia are among the best

known. Other species are found in S. America, Australia, etc. They generally have the power

Common Gecko.

of climbing walls, walking upon ceilings with the back downward, after the manner of flies.

Ged'des, Alexander, 1737–1802; Scottish Roman Catholic ecclesiastic; b. Ruthven; settled in London, 1780, and under the patronage of Lord Petre undertook a translation of the Bible for the use of English Roman Catholics. The third volume (1800) was a commentary on the Pentateuch. As it was written in the spirit of the German rationalistic school, the reading of the work was forbidden, and the author was deposed from the priesthood. Geddes also wrote poems and translations; his imitation of the satires of Horace had extraordinary success.

Geffcken (gĕf'kĕn), **Friedrich Heinrich,** 1830–96; German jurist and publicist; b. Hamburg; entered the diplomatic service of Hanseatic villages; secretary of legation at Paris, 1854; *chargé d'affaires* for Hamburg at Berlin, 1856; and minister resident in Berlin, 1859; in London, 1866; elected to the Senate of Hamburg, 1869; Prof. of Public Law at the Univ. of Strassburg, 1872–82. In September, 1888, he published in the *Deutsche Rundschau* an article, "From the Emperor Frederick's Diary, 1870–71." This, according to Bismarck, then Chancellor of the Empire, revealed secrets, the publication of which constituted treason. Geffcken was arrested and put in solitary confinement. He declared that he had been authorized by the Emperor Frederick to publish the diary three months after his death. After a thorough but fruitless search for the original manuscript, Geffcken was acquitted, and set at liberty, 1889, and the costs of the action put upon the government. He was the author of several works on historical subjects and on international law.

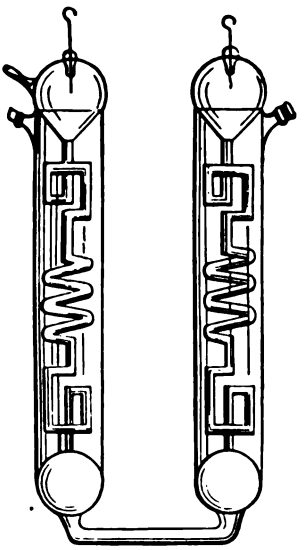
Geffrard (zhā-frär), **Fabre,** 1806–78; President of Haiti; b. L'Anse à Veau; son of Gen. Nicolas Geffrard, who had coöperated with Dessalines and Pétion. Young Geffrard was early distinguished for ability, and though himself a *griffe* (three fourths African blood), took the part of the mulattoes against the blacks. In 1845 he became a lieutenant general; 1849, was made a duke by Soulouque. In 1858 led in the revolution against Soulouque, and banished him, 1860; was President of Haiti, 1860–67, when he was himself banished, and retired to Jamaica.

Geffroy (zhĕ-frwä'), **Mathieu Auguste,** 1820–95; French historian; b. Paris; made Prof. of History at Bordeaux, 1852; of Ancient History at Paris, 1872; Director of the French School at Rome, 1875. He published, "History of the Scandinavians," "Letters of Charles XII," "Gustavus III and his Court," "Rome and the Barbarians," "Madame de Maintenon."

Gehen'na, valley adjacent to Jerusalem, on the S. and SW., also called Tophet, and mentioned in Scripture in connection with the idolatrous rites of Moloch, there celebrated. From the abhorrence with which the Jews after the captivity regarded this worship, the valley was made the common sewer of the city, and a receptacle for all its refuse, which was there consumed by fire. In the New Testament the name is transferred by an easy metaphor to hell.

Geijer (yī'ĕr), **Eric Gustaf,** 1783–1847; Swedish author; 1810, Lecturer on History at Upsal; 1817, Prof.; 1811, was a founder of the Gothic Society, to nurture a national spirit and national manners, and to derive the materials of literature from the ancient traditions of the North. In the *Iduna* (1811–24), the organ of the literary party led by Geijer and Tegnér, Geijer published his finest poems; and he composed the music for many of his own songs. He twice represented the Univ. of Upsal in the Diet. His chief distinction is as the historian of Sweden ("Svenska Folkets Historia," 3 vols., 1832–36).

Geikie (gē'kĭ), **Sir Archibald,** 1835– ; British geologist; b. Edinburgh; entered the Geological Survey of the United Kingdom, 1855; Director of the Survey of Scotland, 1867; Prof. of Geology, Edinburgh Univ., 1871–82; president Geological Society, 1891–92; of the British Association, 1892; Director General Geological Survey of United Kingdom and Director Museum of Practical Geology, 1882–1901; knighted, 1891; published many works on geology and memoirs; secretary of the Royal Society after 1903.



Geissler's Tubes.

Geissler (gīs'lĕr), **Heinrich,** 1814–79; German physicist; b. Igelshieb; removed to Bonn; known as a maker of chemical and physical apparatus, and chiefly as inventor of the Geissler pump for the exhaustion of vacuum tubes, now used in making incandescent lamps, and of the Geiss-

ler tubes of hard glass containing highly rarified gases, which yield brilliant effects when electricity is discharged within them.

Gela (jē'lä), a city of S. Sicily; on the Gelas River, from which it took its name; founded by the Dorians Antiphemus of Rhodes and Entimus of Crete, 690 B.C. The Geloan meadows were celebrated, and Æschylus (who died and was buried here) sang of its fertility. The colony flourished so greatly that in less than a hundred years from the time of its own foundation it could found the city of Agrigentum, which soon became a place of far greater importance than the mother city. Gela was governed mostly by tyrants, and Gelo, Hiero, and Thrasybulus, tyrants of Syracuse, were men of Gela. By the time of Christ, Gela had ceased to be inhabited. The ruins of the city are in the neighborhood of Terranuova.

Gela'nor, last king of Argos of the line founded by Inachus, the river god and aboriginal king; lost his throne on the occasion of a prehistoric invasion of Argos by the Egyptians, traces of whose influence may still be seen in the vicinity of Argos.

Gelasius (jē-lā'sĭ-ŭs), name of two popes, who follow: GELASIUS I (Saint), d. 496; pope; b. Africa; succeeded Felix III, 492; credited with being the first pope to assert independence of the synods and civil authority; wrote against the Nestorian and Eutychian heresies; succeeded by Anastasius II. GELASIUS II (Giovanni di Gaeta), d. 1119; pope; succeeded Pascal II, 1118, being elected by the party hostile to the Emperor Henry V; imprisoned, 1118; escaped and fled to Gaeta, where he excommunicated Henry V and Gregory VIII, the antipope he had caused to be chosen in place of Gelasius.

Gel'atin, semisolid substance of a soft, tremulous consistence, produced from connective tissues (skin, fibrous tissue, etc.) by the action of hot water. Isinglass, calf's-foot jelly, glue, etc., are chiefly composed of gelatin. In its ordinary form it contains much water, which may be dried out, leaving a glassy, brittle mass, which swells, but does not dissolve, in cold water. The gelatin from cartilage is called chondrine, and is somewhat different from true gelatin. Gelatin is extensively used in the arts—as *finings* for beer, as a dressing for silk and other fabrics, as a coating for pills, as a material for capsules for medicines, for preparing tracing paper, as a material for delicate casts, as the basis of jellies; and dried gelatin plates are employed in photography and kindred arts.

Gelée (zhē-lā'), **or Gellée, Claude.** See LORRAIN, CLAUDE.

Gell, Sir William, 1777–1836; English antiquarian; b. Hopton; chamberlain to the Princess of Wales (later Queen Caroline), 1814; accompanied her in her travels; chief works, "Geography and Antiquities of Ithaca"; "Pompeiana; or, Observations upon the Topography, Edifices, and Ornaments of Pompeii."

Gellert (gĕl'lĕrt), **Christian Fürchtegott,** 1715–69; German poet; b. Hainichen, Saxony; Prof. of Philosophy at Leipzig, and celebrated by his fables, poetical tales, etc., as one of the early promoters of that brilliant era in German literature which produced Schiller and Goethe. The latter in his youth was Gellert's disciple.

Gellert, in Welsh tradition, the famous dog of Prince Llewellyn, which, left in charge of his infant child, after a desperate battle killed a wolf that had entered the house. The prince on his return, seeing the cradle overturned and the floor sprinkled with blood, thought the hound had killed his child, and at once plunged his sword into its side. A moment after he found the child safe under the cradle and the wolf lying dead, and saw too late the faithfulness of his dog. Gellert was buried under a tomb which stands to this day in the village of Beddgelert, near the S. base of Snowdon.

Gel'lius. See AULUS GELLIUS.

Gelon (jē'lŭn), or **Ge'lo,** d. 477 B.C.; Sicilian ruler; general of cavalry under Dinomenes, tyrant of Gela; usurped his power; 484, became tyrant of Syracuse, and soon virtual master of the greater part of Sicily; routed the Carthaginians near Himera, 480, which led the invaders to sue for peace; was then acknowledged "savior and king," and lord of all Sicily.

Gelsemium (jĕl-sē'mĭ-ŭm), a genus of plants of the *Logania* family. The yellow jasmine of the S. U. S. is a beautiful evergreen climber (the *Gelsemium sempervirens*), having large, yellow, fragrant flowers, appearing in early spring. The whole plant is poisonous, but is used as a sedative in medicine.

Gem, a precious stone, especially one to be used for ornament or in other ways, after having been cut and polished. The term is used in a special sense to denote a stone carved into a cameo or engraved, that is, with a sunken device or *intaglio* cut on it. The latter form of artistic work makes the true *engraved gem*, and it is as an abbreviated form of that phrase that the word "gem" is most often used. Intaglios, the earliest gems, first appear as the *scarabs* (*scarabœi*) or beetle-shaped signets worn in rings by the Egyptians from a very early period, though those on hard stone are of course rare, owing to their greater cost. On the flat side was engraved the name of the king or of the wearer, and the other was shaped like a beetle. The Greeks, though the latest in the field of gem cutting, excelled all their predecessors, for there were in this art few works of real excellence before they attempted it.

The most ancient Asiatic gems, nearly as old as the Egyptian beetles, are *cylinders*; that is, they are either really cylindrical in form, though not always accurately rounded, or else slightly barrel-shaped, or, again, a little smaller in the middle than at each end. These cylinders are from less than an inch to two inches, or even more, in length. The engraving generally covers

their whole surface except the ends, and the subject of the engraving is not merely an inscription of words or signs standing for words, as in the Egyptian instances, but includes elaborate figure subjects, hunting scenes, or scenes of combat, and also such emblems as the "sacred tree" and the like. The seals of the great men of the Accadians, the Babylonians, the Assyrians, and all the neighboring nations for thirty-five centuries were commonly of this character. Cylinders and scarabs alike were made of many kinds of stone.

Contemporary with the Greeks, the Etruscans attained great excellence in gem engraving, manifesting profound knowledge of anatomy and high finish, but coupled with harsh realism, while the Greeks aimed at ideal beauty. On these early gems of Etruscan or Greek origin can be read the forms of their religion and the subjects of popular interest in politics, song, or fable, for centuries. The art finally attained its highest perfection in Sicily and Magna Græcia.

Among the Romans gem engraving flourished, and under Augustus it reached its very highest point. Cabinets of gems became numerous, and most gentlemen prided themselves on possessing camei and intagli of value. In the time of Lorenzo the Magnificent, who was chief of the Medici from 1469, engraving on hard stones was beautifully done. Often antique works were closely copied, but as often new designs were made in what was thought to be the antique taste. Gem engraving has never been wholly given up since the Renaissance, and many portraits of European statesmen of the eighteenth and nineteenth centuries and other quite modern subjects exist. There was even an English school of great ability and success between 1775 and 1825. Since that time, though cameo cutting and die sinking have been cultivated with zeal, there seems to have been little engraving on hard stones, except as forgeries, to be sold for antiques, and such slight work as ciphers and armorial bearings. See JEWELRY; PRECIOUS STONES.

Gema'ra. See TALMUD.

Gembloux (zhăn-blō'), town of Namur, Belgium; celebrated as the scene of the great victory of Don John of Austria over the United Netherlanders, 1578. The Benedictine abbey, founded here 922, and now the seat of an agricultural academy, was, in the twelfth and thirteenth centuries, famous for its riches and for the learning of its monks. Pop. (1900) 4,216.

GEMINI.

Gem'ini (Latin, "twins"), a sign of the zodiac, into which the sun enters about May 21st, and from which it passes June 21st. Also a constellation of the zodaic, corresponding to the sign Cancer. Castor and Pollux are the two principal stars—the former a fine double one. The constellation may be seen on the Meridian during the evenings of December and January.

Gemis'tus, Georgius, or **Georgius Ple'tho,** b. abt. 1390; Byzantine scholar; b. Constantinople; held office under Manuel Palæologus, 1426; delegate to the Council of Florence, 1438; is said to have lived one hundred years. He is chiefly remembered as a leader of the restoration of learning; author of a number of treatises on history, philosophy, geography, etc., and was the prime mover in the revival of the Platonic philosophy in Italy.

Gemsbok (gĕmz'bŏk), a fine large antelope of S. Africa, the *kookam* of the natives, found in small groups on the open plains. It is often 5 ft. long, and has straight horns about 2½ ft. in length.

Genappe (zhĕ-năp'), town of Belgium, in S. Brabant; 15 m. from Brussels; scene of many battles, but especially noteworthy as the locality of the first engagement in the series which ended at Waterloo, 1815.

Geneal'ogy, the science of descents. As a record of families it holds an intermediate place between biography, which treats of persons and history, of which the subject is the rise and progress of the nation. In England, as in most countries in which the feudal system has prevailed, the laws of the descent of families are intimately connected with the tenure of lands. Where estates pass to a single heir, it is essential that the derivation of that heir from the blood of the first lord should be proved; and as the lines of descent may become successively extinguished, the order in which collateral succeeds must be definitely settled. The latter is the work of the lawyer, and its principles are stated in Blackstone's "Commentaries." The former is the office of the genealogist, who traces out and records the history and growth of families and the relationship of the several branches.

In the U. S. the comparatively recent organization of a number of patriotic societies, which make a proven descent from a colonial or other patriot ancestor requisite for membership, has led to much genealogical investigation, the results of which are usually embodied either in pedigrees or family histories. The former may be arranged as a tree, in which the common ancestor represents the root or stock, and the descendants are arranged in order in the branches or in the form of tables, in which the ancestor and the descendants, with a brief statement of the time of the birth, marriage, and death of each, appear in successive rows of squares or circles, properly connected by lines which indicate the direct descent of every person. From these methods of arranging pedigrees are derived the common expressions family tree, a stock, branches, and lines of descent. The latest and most common practice is to follow a narrative form, by which means genealogists are able to condense their records into a volume of moderate size, and at the same time to make their statements at greater length.

Gen'eral Bass, in music, the equivalent in German for thorough bass, or the system of harmony, as commonly written and illustrated by figures over or under a bass.

General Conven'tion. See EPISCOPAL CHURCH, PROTESTANT.

General Educa'tion Board, American organization founded in New York, 1902, and incorporated by Congress 1903, to promote education in the U. S., without distinction of race, sex, or creed, and especially to promote and make effective various forms of educational beneficence. Soon after its formation it received a gift of $1,000,000 from John D. Rockefeller for the promotion of education in the S. States. Later Mr. Rockefeller gave $10,000,000 more to promote "a comprehensive system of higher education in the U. S.," and, 1907, he made a further gift of $32,000,000, two thirds of which was to be applied to specific purposes, the remainder to become a part of the permanent endowment fund of the board.

Genera'tion, Sponta'neous, or Abiogen'esis, supposed origination of living organisms without parent organisms to produce them, out of inorganic, or at least nonliving, matter, and under the influence of forces purely physical. The fact that minute forms of organic life constantly appear wherever conditions exist favorable to their preservation, notwithstanding the apparent absence of preëxisting germs from which they may have sprung, gave rise to the idea that no such organic antecedents were necessary; that these microscopic forms of life are constantly coming into existence under the operation of the ordinary powers of nature, and therefore that they originate by a generation which is truly spontaneous. The advocates of this theory urge that the germ theory can account only for the propagation of life after life has originated, whereas the theory of spontaneous generation accounts for the origin of life itself.

The notion of spontaneous generation has been entertained by naturalists in every age since the dawn of scientific history, and many experiments have been made by them. Pasteur showed that in multitudes of instances infusions hermetically sealed while boiling remained for indefinite periods of time free from all traces of organic life, while portions of the same infusions exposed side by side with these, but open to the air, were speedily swarming with life. He found that even an unsealed flask, of which the neck had been stopped during the boiling only with a plug of cotton closely pressed together, continued to be equally free from these organisms so long as the stopper remained in its place. This last experiment presented a rather curious resemblance to that of Redi (b. 1626) with a gauze-covered jar; for the cotton forming the plug was found, on a microscopic examination, to contain the germs which its presence had prevented from entering the flask. Wyman, Bastian, Cantoni, and others reported results at variance with Pasteur's, showing that bacteria will make their appearance in infusions which have not only been boiled before being sealed up, but which, after being sealed, have been kept at a boiling heat for many hours; but the methods of bacteriological research which have been elaborated since 1878 have shown that the methods employed by these experimenters would not insure the killing of all spores, and especially of the spores of the hay bacillus, and it may now be considered as definitely settled that there is no evidence that spontaneous generation can occur on the earth under existing circumstances. Whether under any circumstances life can originate in nonliving matter under the influence of physical forces only is a question which at present cannot be answered. See BIOGENESIS; REPRODUCTION.

Gen'esis, first book of the Bible and of the group called the Pentateuch, one of the most ancient of existing books, containing an account of the creation, of man's original happy state, his sin and fall, of the deluge, and the restoration and dispersion of mankind, ending with the story of Abraham and his early descendants. Its authorship is ordinarily ascribed to Moses, but some have questioned its unity, regarding it as a compilation from various older records; and still others have questioned its historical character. See HEXATEUCH.

Genêt (zhĕ-nā'), **Edmond Charles,** 1765–1834; French diplomatist; b. Versailles; brother of Madame Campan; *chargé d'affaires* at St. Petersburg, 1789–92; minister to the U. S., 1793–94; recalled on demand of Washington for having taken unwarrantable measures with the idea of forcing the U. S. into a war with Great Britain; settled at Schodack, N. Y., and there died.

Gen'et, a name given to various carnivorous mammals of the family *Viverridæ* and genus *Genetta*. There are several species, mostly African. The common genet, found wild from

COMMON GENET.

France to the Cape of Good Hope, is the best known. At Constantinople and other places it is domesticated, and used to destroy rats and mice. It is gentle, and prized for its soft and beautiful fur.

Genet'ic Psychol'ogy, the science of the mind considered from the point of view of its origin and growth, both in the child and in the race. From the genetic point of view the mind is no longer considered, as in the old faculty psychology, as a fixed unchanging substance with a certain number of faculties, but as a growing, developing activity or function. Instead of trying to find in the infant all the faculties of the man, genetic psychology tries to reduce

the mind of the man as far as possible to the simplicity of that of the child, and then to trace, by actual observation and experiment with children, the order of rise of the more complex mental processes and their relative bearing on one another.

The events of the infant's consciousness are simple rather than reflective. What we find in a child's mind are simply his presentations, memories, thoughts; not what he himself thinks of them, or what he observes and reports them to be. In adult consciousness, on the contrary, the disturbing effects of reflection have been considered, ever since Kant pointed them out, a matter of notorious moment. It is impossible for me to report exactly what I feel, for example, for by observing it, attending to it, I have myself altered it. But the child's feeling is simple; his emotion is spontaneous. He has not yet learned the social and personal prejudices, vanities, and conventions which affect every adult; he does not look at himself through the countless lenses of time, place, and circumstance. So in his mental processes the psychologist finds his data in their purest and simplest form.

It is by the study of children that we are able to test the truth of the analyses which we make in general psychology. For example, it is clear that volition cannot be present until certain nerve tracts are developed which are absent from the brain at birth, for physiologists have shown that all voluntary action is accomplished by means of these tracts. Similarly, it is impossible that a child should learn to speak until certain brain centers are developed and duly connected with one another.

The actual development of the child, as genetic psychologists now represent it, may be indicated as follows. Shortly after birth the child begins to connect his impressions with one another and to show memory. But both memory and association are very weak and depend upon intense stimulations, as bright lights, loud noises, etc. At three months of age most children will forget a person after a few days of absence. Attention comes in the first quarter of the first year, and is purely reflex. It appears earliest in response to sounds and sights. It is probable that the earliest consciousness is simply a mass of touch and muscular sensations experienced in part before birth. The first movements are largely random reflexes, due to discomfort, or aimless spontaneous discharges. About the sixth month the child begins to imitate movements and noises, and he then enters upon a remarkable series of adaptations. In his "try-try-again" or "persistent" imitations the first voluntary efforts occur. The first exercises of will are thus aimed at the control or direction of his own muscular movements. It is only on this basis—that of active muscular exertion—that he gradually builds up the notion of self, and is so entitled to be called self-conscious.

Gene'va, city of Switzerland; capital of canton of same name; on both sides of the Rhone where it issues from Lake Geneva. The old city on the left bank was enlarged, 1850, by converting the fortifications into promenades and quays. The portion on the right bank is more modern, and the two parts are connected by bridges, of which the Mont Blanc, near the lake, is a magnificent structure. The city has a cathedral dating from the twelfth century; a university founded 1368, and reorganized by Calvin and Beza; the Musée Rath, devoted to the fine arts, and commercial, industrial, and musical schools. The industries are chiefly confined to making of watches, music boxes, and jewelry. As the center of Calvanism, Geneva has played a conspicuous part in European civilization.

The territory of Geneva is supposed to have formed part of the territory of the Allobroges. It was subjected to the Romans abt. 122 B.C. The city was burned during the reign of Elagabalus, and rebuilt by Aurelian, who called it Aurelianum Allobrogum. After this it fell successively into the hands of the Burgundians and Franks, the counts of Genevois and the dukes of Savoy, and from the claim of the last, the Genevans could only free themselves after several centuries by alliances with other Swiss states, and by the aid of the Reformation. Calvin was the temporal as well as spiritual ruler of the town, which was called the "Rome of Protestantism." In 1798 it was incorporated with France as a part of the department of Leman. After the overthrow of Napoleon it joined the renewed Swiss Confederacy (March 20, 1815), and several places which had formerly belonged to France and Savoy were added to its territory. A more liberal constitution was adopted, 1847. The Geneva Convention of 1864 brought about an agreement among European powers to consider the edifices and members of medical departments strictly neutral in time of war. The court of arbitration on the *Alabama* question sat here, 1871–72. Pop. (1900) 105,710.

Geneva Arbitra'tion, The, settlement of the claims of the U. S. against Great Britain by a tribunal which met at Geneva, Switzerland, 1871, according to the terms of the treaty of Washington, signed February, 1871. See ALABAMA CLAIMS.

Geneva, Conven'tion of, engagement entered into at Geneva, Switzerland, August 22, 1864, by France, Switzerland, Belgium, Portugal, Holland, Italy, Spain, Denmark, Baden, and Prussia, for the neutralization and exemption, so far as possible, from the casualties of war of all persons, vehicles, and buildings devoted to the sick and wounded. Since 1864 the accession of many additional states, including all the military powers of Europe and of the American continents, except Brazil, has made the application of its rules almost universal. On October 20, 1868, fifteen additional articles were agreed upon, chiefly relating to maritime wars.

Geneva, Lake of, or **Lake Leman** (lē-mān'), a lake between Switzerland and Savoy; extending 45 m. from E. to W. in the shape of a crescent. Its width varies from a mile at the W. end to nearly 10 m. at the E. end, where its greatest depth reaches 980 ft.; area, 223 sq. m. It is

traversed by the Rhone, which discharges its muddy waters in it, and issues from it at Geneva at its SW. extremity, a pure and transparent stream of a deep-blue color. This lake is celebrated for the grandeur of the surrounding scenery and the loveliness of its shores.

Geneviève (zhĕn-vē-āv'), **Daugh'ters of St.,** called also MIRAMIONS, order of religious women in France; founded, 1636, by Francesca de Blosset. Its members took no monastic vows, but devoted themselves to teaching and to caring for the sick. In 1665 the order was united to the proper Miramions (founded 1661).

Geneviève, Saint, abt. 422–512; patron saint of the city of Paris; b. Nanterre, or at Montrière; dedicated in her girlhood to a life of virginity and religious devotion; after the death of her parents, went to Paris; prophesied the invasion of the Huns under Attila, but declared that Paris would be spared. The prophecy came true, and added to her reputation for sanctity. On the capture of Paris by the Franks, her intercession caused the city to be treated with leniency by the conquerors. She was buried in the church that bore her name. A later edifice built in her honor, 1764, became the Pantheon, 1791. This was destroyed in the Revolution and her relics were transferred to the church of St. Étienne du Mont. Her feast is celebrated January 3d.

Gen'ga, Girolamo, 1476–1551; Italian painter and architect; b. Urbino; painted in Rome, Cosena, and other cities; built the Church of Saint John the Baptist in Pesaro, the Episcopal palace in Sinigaglia, embellished the bishop's palace at Mantua, etc.; court architect to Duke Francisco Maria of Urbino; also an able sculptor, musician, and writer on the fine arts.

Genghis Khan (jĕn'gĭs kän), or **Jen'ghis Khan** (literally "the greatest khan" or "ruler"), 1162–1227; originally *Temujin*; Mongol conqueror; b. Deylun Yeldâk, on the Hwang-Ho; son of the chief of the tribe, Neyrun, whom he succeeded at fourteen years of age, making himself master of the neighboring tribes. Aided at first by Oung (Ung), Khan of the Karaite Mongols, whose daughter he married, he became master of Mongolia by 1204 and subdued most of Tartary. In 1211 he crossed the Great Wall of China; sacked and burned the capital, Pekin, 1215; had conquered all Turkestan, 1220; for seven years plundered Asia as far S. as the Sutlej and penetrated Europe as far as the Dnieper. At sixty years of age he led his army against the King of Tangut (SW. China) and defeated him, and immediately sent two of his sons to complete the conquest of N. China. He caused by his wars the death of more than 5,000,000 persons; with Karakorum in Tartary as his capital, he founded what became the Mogul Empire. He enforced order, established a postal system, and tolerated all religions. At his death his four sons divided his dominions.

Gen'ipap, whitish-green fruit of *Genipa americana*, a S. American tree of the family *Rubiaceæ*. It has a rich purple juice and an agreeable vinous flavor.

Ge'nius, plural **Ge'nii,** good or evil spirit who, according to the ancients, presided over the destiny of human beings. Among the Romans the genii were tutelary spirits attached to places as well as to persons or peoples. The doctrine of genii was Etruscan. These spirits received worship, especially at wedding festivities and other occasions of joy. Genii are figured in art as winged youths, or sometimes as serpents.

Genlis (zhŏn-lēs'), **Stéphanie Félicité Ducrest de St.-Aubin** (Countess de), 1746–1830; French writer; b. near Autun; 1752, entered the Church as canoness of Alix; 1761, married to the Count de Genlis; 1770, attached to the household of the Duc de Chartres (afterwards the Citizen Egalité); 1782, governess to his children, and, according to rumor, his mistress; 1793, obliged to leave France, but in 1800 returned. Among her best writings are the educational works designed for her young pupils, the Orleans princes, and "Mademoiselle de Clermont," a short novel. Her personal "Mémoires" abound in scandal, and are full of malignant attacks on prominent persons.

Gennesaret (gĕn-nĕs'ă-rĕt), or **Genes'areth, Lake of,** called also SEA OF CHINNERETH, SEA OF GALILEE, and SEA OF TIBERIAS; in N. Palestine, 65 m. N. of the Dead Sea; greatest width is 8 m., extreme length 12½ m. The Jordan, flowing through it from N. to S., connects it with the Dead Sea. In the basin of the lake are several warm springs. Its level is 680 ft. below that of the Mediterranean. Tiberias, Capernaum, and Magdala were on its W. shore.

Gen'oa, maritime and commercial town of Italy; on Gulf of Genoa; contains many churches and palaces, and some fine streets, but, being built on hills, many are narrow, ill-lighted, sometimes stairlike thoroughfares, scarcely passable for mules. The most noteworthy churches are St. Maria di Carignano, of remarkable architecture; SS. Andrea and Ambrogio, begun in the sixth century; St. Annunziata, and St. Lorenzo, the cathedral, built in 1100. The Carlo Felice is the finest and most spacious of the several theaters. In the Piazza d'Acqua is a monument in honor of Columbus, who was born at Cogoleto, 15½ m. W. of Genoa. The favorite promenade is the elevated park, called Acqua Sola. The city has a university, a royal marine school, a school of navigation, and a school of fine arts. Shipbuilding is carried on extensively. Elegant furniture in wood, such as chairs, tables, cabinets, etc., silks, velvets, and laces, as well as the coral and silver filigree work of Genoa, have a wide reputation.

Genoa was destroyed by Carthage, 204 B.C., but was soon rebuilt by its allies. In the sixth century it fell into the hands of the Lombards, who were dispossessed by Charlemagne. The depredations of the Saracens forced Genoa to strengthen her navy, thus laying the foundation of her maritime power. In 1240 Genoa received from Emperor Michael Palæologus the cession of Galata and Pera, suburbs of Constantinople, and of the port of

Smyrna, so that for a time she controlled the commerce of India through the Black and Caspian seas. The early government of Genoa, democratic in form, was very turbulent until 1270, when the famous Guelph "captains of liberty" assumed control under pretext of restoring order. The first doge was elected in 1339. In 1499 France obtained possession of Genoa; but in 1528 Andrea Doria, the admiral of Charles V, restored his country to independence. The Austrians held the city for three months in 1746. Bonaparte, 1796, gave Genoa the title of the Ligurian Republic, but in 1805 annexed both town and province to France. By the Peace of 1815 the Genoese territory became part of Sardinia, and is now a province of Italy. Pop. (1901) 234,710.

Genoa, Gulf of, the name generally given to the Mediterranean N. of Corsica, where between Spezia and Oneglia the coast of Italy retreats with a large curve. It is a bay, however, rather than a gulf, and receives numerous small rivers. The Gulf of Spezia is its chief inlet. On this gulf is situated the city of Genoa.

Genovesi (jä-nō-vä'sē), **Antonio,** 1712–69; Italian philosopher and political economist; b. Castiglione; ordained a priest, 1736; Prof. of Rhetoric at Salerno; in 1743, began to lecture on philosophy at the Univ. of Naples; 1754, Prof. of Political Economy; published "Elements of Metaphysics," "Logic," "Lezioni di Commercio," the first complete and systematic work on political economy in Italian.

Genre (zhäñ'r'), in fine art, a style which illustrates subjects of simple and everyday nature; domestic scenes, common incidents, and the like.

Gens. See TRIBE.

Gens d'Armes, or **Gendarmes** (zhäñ-därm'), a title in France anciently applied to the whole body of men liable to military service. From the twelfth to the sixteenth century it designated the body of nobles and gentry serving under the kings of France. It now denotes the French military police, generally soldiers detailed from the army, but performing civil duties in time of peace; about half are mounted.

Gen'seric, d. 477; King of the Vandals; natural son of a Vandal king in Spain, and joint heir of the kingdom with Gonderic, his brother, whom he succeeded, 428 A.D. In 429 he crossed to Africa with 50,000 men; sacked and burned Hippo, 431; captured Carthage, 439, and dismantled all the African towns except Carthage; overran Sicily, 440; took and sacked Rome for fourteen days and nights, 455, robbing the city of its treasures of art; remained master of Carthage and the terror of both the E. and W. empires.

Gentian (jĕn'shăn), a genus of plants of the family *Gentianaceæ*, of which the most important species is the yellow gentian, growing on the mountainous meadows of Central and S. Europe. The dried root is an important drug. The roots of the several perennial species in the U. S. are used as tonics. Many species

GENTIANA LUTEA.

have very beautiful flowers, as the fringed gentian, an autumnal biennial.

Gen'tile, name applied by Jews to all not of their own nationality. The Mormons apply the term Gentile to those who are neither Mormons, nor Jews, nor aboriginal Indians, for they regard the latter as a remnant of the lost tribes of Israel.

Gentile da Fabriano (jĕn-tē'lā dä fä-brē-ä'nō), GENTILE DI NICCOLO MASSI, abt. 1350–1428; Italian painter; b. Fabriano, Umbria. In 1422 he went to Florence, and spent most of his after life in central Italy. He painted at Orvieto, Siena, Perugia, and Città di Castello, as well as at Florence and Rome. His paintings have generally perished. A large picture in the Academy at Florence, "Adoration of the Three Kings," once the center of an elaborate altarpiece, is perhaps Gentile's most valuable work.

Gen'tleman, in Great Britain, a man of a rank above that of yeoman. The term *gentry* in a large sense includes the nobility, but in popular use often excludes them. Thus British society is divided into nobility, gentry, and yeomanry, and families are either *noble, gentle,* or *simple.* Some of the Plantagenet kings gave patents of gentility. Certain old authorities make the bearing of coat armor the test of gentility, but Chaucer puts it on a better ground: "He is gentil that doeth gentil dedes." The French *gentilhomme* was properly a title belonging to those of noble birth.

Gentlemen-at-Arms, formerly called GENTLEMEN PENSIONERS, in the court of Great Britain, one of the divisions of the royal bodyguard, the others being the "Yeomen of the Guard" (Beefeaters) and the Royal Archers (for Scotland). The Gentlemen-at-Arms consist of one captain (Gold Stick), one lieutenant (Silver Stick), one standard bearer (Silver Stick), one clerk of the check, adjutant and harbinger, one suboficer, and forty gentlemen, for the most part retired officers of the

army. It is the oldest corps in the royal service. Instituted, 1509, by Henry VIII, this bodyguard received the present name, 1834. It is only mustered for duty at drawing-rooms, levees, and great state ceremonies. The captain of the corps goes out of office with the ministry.

Ge'nus, plural **Gen'era,** lowest group in the animal or vegetable kingdom with which a name is habitually connected that enters into the composition of the specific designation of each independent species; thus, we have in the wolf (1) a representative of a genus (*Canis*), to which it belongs in common with many other animals; and (2) of a peculiar species (*C. lupus*): the specific name (*C. lupus*) is, as a whole, peculiar to itself and shared with no other species. The genus, as now limited, has been defined as the expression of the ultimate modification of structure. An adequate idea can only be given by example; thus, the wolf, in common with the dog, coyote, jackal, and certain other like forms, constitutes a genus, *Canis*, in contradistinction to the red fox (*Vulpes*), which is also composed of a number of species, and the gray fox (*Urocyon*), of which there are at most but two species: the species, in each of these genera, are defined by trivial differences in detail of structure or color, and the genera differ from each other in certain distinctive anatomical characters which are more prominent than any observable within the limits of any one of the genera. Genus is subordinate to order, tribe, and family. The genera name is abbreviated often, as *C. lupus*.

Genzano (jĕn-zä'nō), town of Italy; 16 m. SE. of Rome. It contains some fine buildings, but is chiefly known by its yearly festival of the Infiorata, on which occasion (the Sunday of Corpus Domini) the streets are covered with flowers, so arranged as to produce a kind of floral mosaic.

Geodesy (jē-ŏd'ē-sĭ), the art and science of surveying large portions of the surface of the earth, determining its curvature and other elements, thus obtaining data for maps, and for inferring the figure and magnitude of the entire earth. It differs from surveying, in that the latter covers such small regions that the rotundity of the earth need not be taken into account, and does not aim at the highest attainable precision. It is sometimes regarded as a branch of practical astronomy, because astronomical observations are necessary to its successful prosecution.

Geoffrey (jĕf'rĭ) **of Mon'mouth,** d. abt. 1154; a Welsh chronicler; Bishop of St. Asaph, 1152. His most important work, "Historia Britonum," is a pseudo-chronicle of the early kings of Britain, such as Lear, Gorboduc, Arthur, etc., but it so abounds in fables as to have small historic value.

Geoffrin (zhō-frăń), **Marie Thérèse** (Rodet), 1699–1777; French social leader, famous for her tact and wit; b. Paris; married M. Geoffrin, a man of insignificant character but great wealth. She made her house the resort of authors, savants, artists, and the aristocracy, whom she entertained at regular intervals. In her travels she received the most flattering attentions from foreign courts. Her intimacy with the Encyclopédistes, however, who were not favored by the French Govt., prevented her being received at Versailles. Her beneficence was remarkable, and included all classes of society.

Geoffroy St.-Hilaire (zhō-frwä' săń-tē-lār'), **Étienne,** 1772–1844; French zoölogist and physiologist; b. Étampes; Prof. of Zoölogy, Jardin des Plantes, 1793; engaged in the Egyptian explorations, 1798–1802; elected to the Legion of Honor, 1803, to the Institute, 1867; Prof. of Zoölogy, Faculty of Sciences, 1809. Geoffroy, who was a synthesist, contended that, though all animals are formed according to some common plan, the same forms, owing to a change in the conditions of life, have not been preserved; while his opponent, Cuvier, who was an analytic observer, maintained the absolute invariability of species. His principal works include "The Principle of Unity in Organic Composition," "Philosophy of Anatomy," "Ideas of Natural Philosophy," "Natural History of the Mammifers."

Geoffroy Saint-Hilaire, Isidore, 1805–61; French naturalist; b. Paris; son of the preceding; his father's assistant, 1824; entered the Institute, 1833; inspector of the Academy of Paris, 1840; Prof. of Zoölogy in the Museum, 1841, and in the Faculty of Science, 1854; Prof. in the Société d'Acclimatation, 1854; published a "Life" of his father, "Natural History," "History of Anomalies of Organization in Man and Animals," etc.

Geog'raphy, literally, a description of the earth, including the nature of the land and waters, of the climate and natural productions, of the various countries, together with an account of the people and nations inhabiting them, and of their social and political conditions. Geography, as the science of the earth, is naturally divided into three departments: the earth considered as a planet, a part of the solar system, or *Astronomical Geography*; the earth considered in itself, the *Geography of Nature*, or *Physical Geography*; the earth considered as the abode of man, the *Geography of Man*. These are usually called *Mathematical, Physical,* and *Political Geography*. *Mathematical Geography* embraces two distinct sciences, as (*a*) *Astronomical Geography*, which treats of the position of the earth in the solar system, of its rotation and revolution around the sun as causes of the daily and annual changes in the distribution of solar light on the surface of our planet, or the succession of days and nights and seasons. (*b*) *Mathematical Geography* proper includes geodesy, which teaches the exact form of the earth, and of all portions of its surface, and their location in longitude and latitude; *Topography*, which surveys the minor features of relief and position of land and water, the location of mountains, rivers, and places; and *Cartography*, which teaches how to represent them on maps and globes.

Physical Geography is the geography of nature. When it confines itself to a simple description of the natural features of the land it is called *Physiography*. When applied to the waters, it is *Hydrography*. The investigation of the distribution of animals in relation to the various elements of topography and climate is the *Geography of Animals or Zoögeography*, and its sister science is the *Geography of Plants* or *Phytogeography*. *Political Geography*, or the globe as the abode of human races and societies, may be a simple description of the various races and nations of men as found in their present dwelling places; *Ethnography*, the scientific form of which, inquiring into the principles underlying their nature, relations, and formation is *Ethnology*. To give a description of the civilized nations, their characteristics, their boundaries and extent, their territories, an enumeration of their cities, an account of their constitution and government, of their population and resources, is the object of *Political Geography* proper, while *Statistics* gives the numerical data relating to these various branches.

The earliest idea of the earth formed by mankind seems to have been that it was an immense disk, in the center of which their own land was situated, surrounded by the ocean, and covered by the sky as with a canopy. The Phœnicians were the first people who made any great progress in extending the bounds of geographical knowledge. They seem to have explored all the shores of the Mediterranean, and at an early period to have passed the Pillars of Hercules (the Strait of Gibraltar), and visited to some extent the Atlantic shores of Europe and Africa, extending their voyages as far N. as Britain and as far S. as the Tropic of Capricorn. In the Homeric poems (which may be regarded as representative of the ideas entertained by the Greeks about the commencement of the ninth century B.C.) the earth is supposed to resemble a circular shield surrounded by a belt of water which was the source of all other streams. The world of Herodotus (b. 484 B.C.) extended from the Atlantic to the W. boundary of Persia, and from the Red Sea or Indian Ocean to the amber lands of the Baltic. The Indian expedition of Alexander the Great (330 B.C.) greatly enlarged the ancient knowledge of N. and E. Asia. Abt. 320 B.C. Pytheas, a seaman of Massilia (ancient Marseilles), a Greek colony, sailed along the W. coasts of Spain and Gaul, visited Britain, and, pursuing his voyage, discovered an island, henceforward famous as Ultima Thule, which is supposed to have been Iceland. Eratosthenes (276–196 B.C.) first used parallels of latitude and longitude, and constructed maps on mathematical principles. He considered the world to be a sphere revolving with its surrounding atmosphere on one and the same axis, and having one center. The Geography of Strabo, a Greek of Pontus, written about the beginning of the Christian era, embodies all that was known of the science at that period. The countries lying round the Mediterranean were known with tolerable accuracy, but the Atlantic shores of Europe were very vaguely comprehended, while of the N. and E. portions the most erroneous notions prevailed. Pomponius Mela, an early Roman geographer, wrote about the time of the Emperor Claudius. He divided the world into two hemispheres, the N., or known, and the S., or unknown; the former comprising Europe N. the Mediterranean and W. of the Tanais (Don); Africa S. of the Mediterranean and W. of the Nile; and Asia. The next famous geographer is Ptolemy, who lived at Alexandria about the middle of the second century A.D. In Europe, Spain and Gaul were now correctly delineated, together with the S. shores of Britain. N. Germany and the S. shores of the Baltic were pretty well known, as also some portion of Russia in the neighborhood of that sea, and the S. part of European Russia. In Asia it was considered certain that there were wide regions inhabited by nomadic tribes called Scythians, while from the Far East came some vague reports of China. The geography of Ptolemy remained the acknowledged authority during the whole of the Middle Ages. From his time up till the thirteenth century no advance was made in geographical knowledge until Marco Polo opened up new fields of inquiry. The account of his travels first made known to Europe the existence of Japan and many of the E. Indian islands and countries. Then followed the discovery of America in 1492, and from this time forward the progress of discovery was extremely rapid. In 1495 the Cape of Good Hope was doubled by Vasco da Gama four years after its discovery by Bartholomew Diaz. Within thirty years from the date of the first voyage of Columbus the whole of the E. coast of America from Greenland to Cape Horn had been explored. In 1520 Magellan passed the straits which bear his name, and his vessel, crossing the Pacific and Indian oceans, returned to Europe by way of the Cape of Good Hope, being the first that had circumnavigated the globe. The W. coast of America was explored as far as the Bay of San Francisco about the middle of the sixteenth century. At the same time discovery in the East advanced with rapid strides. Within twenty years of Gama's arrival in India the coasts of E. Africa, Arabia, Persia, and Hindustan had been explored, and many of the islands of the great archipelago discovered. The expeditions of Willoughby and Frobisher in 1553 and 1576, of Davis in 1585, of Hudson in 1607, and of Baffin in 1616, though they failed in their object of finding a NW. passage to India, materially enlarged our knowledge of the Arctic regions. By the middle of the seventeenth century the Dutch, under Tasman and Van Dieman, made the Australasian islands known to the world. Late in the following century Capt. Cook added largely to geographical knowledge by his survey of the Pacific and its innumerable islands. The Antarctic continent was discovered in 1840 by American, English, and French expeditions, and the NW. passage round N. America was found by M'Clure in 1850. The travels of Humboldt, Spix, and Martius, Lewis and Clark, Frémont, and others, have made us acquainted with the general features of the American continent. In Asia numerous trav-

elers have contributed much to render our knowledge certain and precise in respect to a great part of the continent. The interior of Australia has been explored by Sturt, Eyre, Leichhardt, Burke, Willis, King, M'Douall, Stuart, etc. The opening up of the African interior has been materially advanced by the explorations of a host of travelers, including Bruce, Park, Denham, Clapperton, the Landers, Burton, Speke, Grant, Baker, Barth, Livingstone, Rohlfs, Schweinfurth, Cameron, Stanley, etc. See GLOBE; MAP; PHYSICAL GEOGRAPHY; PHYSIOGRAPHY; TOPOGRAPHY.

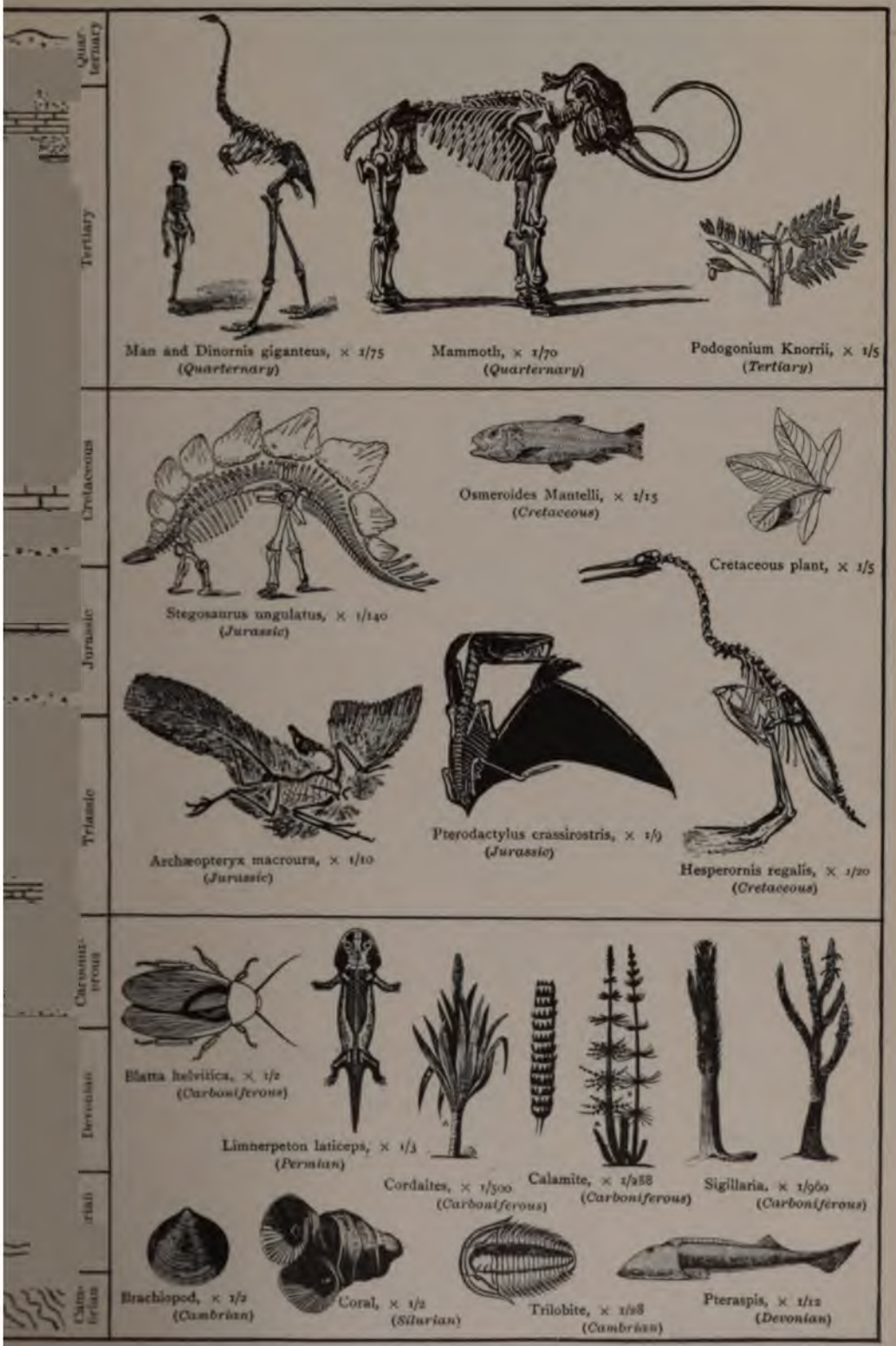
Geolog'ical Sur'veys. See SURVEYS, GEOLOGICAL.

Geol'ogy, science which treats of the structure of the earth, and of the methods by which its materials have been arranged. The investigation of the chemical agencies which have presided over the formation of the various kinds of rocks and minerals belongs to chemical geology, while the laws which have regulated their deposition, structure, and arrangement constitute dynamical geology. Besides the great distinction between crystalline and uncrystalline rocks is that of stratified and unstratified rocks, having reference not to their intimate structure, but to their geognostical relations. The stratified rocks include all those which appear to be arranged in beds or strata, whether crystalline or not; and the unstratified, those which, like granites, traps, basalts, and volcanic lavas, occur in masses which are destitute of such arrangement, and appear to have been forced into their present position while in a more or less softened or molten condition. These are eruptive, irruptive, or intrusive rocks. They are with a few exceptions crystalline. A third class of crystalline rocks are those which occur as veinstones in the fissures of other rocks, and have probably been deposited from watery solutions. Such are the quartz and spars which form the gangue of many metallic ores, and a large part of the so-called granite veins. The unstratified crystalline or eruptic rocks include the modern volcanic lavas, which are evidently the products of igneous fusion, and the whole class is therefore sometimes designated as igneous rocks.

The geological history of the earth comprises five great eras: the Azoic (destitute of life), or Archean; Agnotozoic, or Proterozoic; Paleozoic (ancient life); Mesozoic (middle life), and Cenozoic (recent life). To the Azoic era is assigned the Archean period; to the Proterozoic, the Algonkian period; the Paleozoic comprises the Cambrian, Silurian, Devonian, and Carboniferous periods; the Mesozoic (called by Agassiz the Age of Reptiles), the Jura-Trias and Cretaceous; the Cenozoic, the Eocene, Neocene, and Pleistocene periods. The Archean period is the time occupied in the formation of the oldest known rocks. These rocks are largely of igneous origin, but probably also in part sedimentary. The formations representing the Algonkian period are in general less metamorphosed than the Archean. A few ill-preserved fossils have been found, and the presence of life during the period is indirectly indicated by the abundance in its formations of minerals which are now deposited chiefly by organic processes. It is also indicated by the high development of the Cambrian fauna. As the organization of Cambrian forms is not of low type, it is inferred that life began much earlier. The periods from Cambrian to Neocene inclusive are characterized by their several faunas, and the formations representing them are for the most part identified by means of fossils. The formations of each period represent all types of sedimentation. The Carboniferous period was so named on account of the coal contained in some of its formations in Europe, and the Carboniferous of E. America is similarly characterized by coal seams; but in W. America coal occurs in Cretaceous and Cenozoic rocks, and the Carboniferous formations are barren. Chalk, which is a rock of rare occurrence, is so characteristic of Cretaceous formations in England and France as to have given its name to the period, and is developed among formations of the same age in Texas and neighboring states. Glauconitic rock, or greensand, having its greatest development in the Cretaceous of England, occurs also in Cretaceous rocks of the coastal plain of the U. S.

Among the rocks of all periods occur formations characterized by fresh-water shells, or otherwise shown to have been deposited in inland water, but these are peculiarly abundant in the Eocene and Neocene. The explanation of the peculiarity is probably found in the fact that lake beds are specially liable to be carried high above base level by continental changes, and therefore often completely disappear through degradation of the land. The Pleistocene period, which was closed by the Champlain epoch, was shorter than any other, and is peculiar in that its chief events were primarily climatic and its most important deposits are glacial instead of sedimentary. In all regions, but more especially in Arctic and temperate zones, glaciers then advanced far beyond their present limits, and immense ice fields were developed in Europe and America, the retreat of which was marked by characteristic deposits, such as the Erie clay. In the tracts covered by these ice fields and in their immediate vicinity Pleistocene phenomena are sharply distinguished from all others, and an effect of the associated climatic changes has been recognized in the enlargement of inclosed lakes and seas. To a limited extent also certain coastal changes have been connected with glacial phenomena, but over the greater portion of the land Pleistocene formations have not been discriminated from the Neocene. It is believed that the Cenozoic era was twenty to one hundred times as long as the Pleistocene period, that the Mesozoic era was two to four times as long as the Cenozoic, the Paleozoic three to six times as long as the Mesozoic, and the Agnotozoic one to three times as long as the Paleozoic. Further information concerning each period will be found in the article bearing its name.

Estimates of the earth's age based on geologic data have ranged from 10,000,000 to 20,000,000 years to as many billion years. Lim-



FLORA AND FAUNA OF THE GEOLOGICAL PERIODS.

its derived from the refrigeration of the earth range from 20,000,000 to 400,000,000 years. The limiting period determined by the sun is estimated at from 10,000,000 to 20,000,000 years. See ARCHÆAN, CENOZOIC, MESOZOIC, PALEOZOIC, PROTEROZOIC ERAS; PHYSICAL GEOGRAPHY; PHYSIOGRAPHY; ROCKS.

Geomet'rical Mean. See MEAN.

Geometrical Progres'sion. See PROGRESSION.

Geom'etry, science of relations in space. As its name indicates, it originally denoted the measurement of land, and was equivalent to surveying. Geometry may be divided into elementary and higher geometry. Elementary geometry treats of angles, straight lines, planes bounded by straight lines, solids bounded by planes, circles, cylinders, cones, and spheres. The treatment of all curves except the circle, and of all surfaces and solids which involve the consideration of any curve other than the circle, belongs to higher geometry. Elementary geometry is sometimes subdivided into planimetry and stereometry, the former treating only of such lines and figures as lie in a plane, the latter of solids bounded by planes, and of the sphere, cone, and cylinder, which are usually designated as the three round bodies. That part of planimetry which treats of the measurement of triangles is called trigonometry. Geometry again is divided into synthetic and analytic, or ancient and modern, or special and general; divisions which all signify the same thing, and are based upon the difference between the methods which are employed. Synthetic, ancient, or special geometry is founded upon the direct observation of the forms or figures themselves, and all its reasonings are conducted with direct reference to those figures. The analytic or modern method is, as to its form, characterized by the application of the processes of algebra and the calculus to the discussion of the relations of space; but its true nature consists in its generality. Modern geometry substitutes, in place of the consideration of the geometrical magnitudes themselves, the consideration of equations representing them according to a general system. Descriptive geometry is the transmutation of figures, reducing the geometry of three dimensions to geometry in a plane.

According to a tradition of the Greek historians of geometry, the science took its rise among the Egyptians, through their efforts to restore their landmarks after inundations. Among the Greeks it was developed by Pythagoras, Apollonius, Euclid, and Archimedes. The last named introduced the method of exhaustion, by increasing the number of sides of circumscribed and inscribed polygons about a circle. Kepler (1571–1630) introduced the idea of the infinitesimal, thus perfecting the Archimedean exhaustion. What was considered the most wonderful of all the geometrical inventions of the seventeenth century was that of Descartes, published 1637, which consisted simply in considering every line as the focus of a point whose position is determined by a relation between its distances from two fixed lines at right angles to each other. The relation between these distances, being expressed in algebraical language, constitutes the equation of the curve. Huygens, making a combination of Descartes's methods with those of his predecessors, added to geometry the beautiful theory of evolutes, which he applied to the pendulum and to optics. Newton also invented methods by which the consideration of the ellipse and parabola became independent of that of any solid. Newton's fluxions and Leibnitz's differential calculus soon came into use, and Newton, Maclaurin, and Cotes made the most exhaustive investigation into curves of the third degree.

The value of geometry as a mental exercise is due to the close chains of reasoning which it develops upon abstract relations between plane surfaces or solid figures. Geometrical proof may be either direct or indirect. If the reasoning is *direct* it starts from some axiom or self-evident truth and reaches a conclusion by a series of incontrovertible logical steps. *Indirect* proof starts with an assumption which may or may not be true, but which is proved or disproved by a chain of deduction each step of which proceeds logically from facts known to be true. If the first assumption is shown to be false or impossible, the proof is known as a *reductio ad absurdum* (reduction to an absurdity). The whole superstructure of geometry is based upon a few simple definitions and axioms. The definitions assert such simple facts as "a point is position without magnitude, a straight line is the shortest distance between two points, a circle is a plane figure bounded by one curved line every point of which is equally distant from a point within the circle known as its center." The axioms of geometry are propositions which are self-evidently true, and include such incontrovertible truths as, "All right angles are equal, geometrical figures can be moved in space without change of shape or size, magnitudes which coincide with each other are equal, the whole is greater than any of its parts, two straight lines cannot enclose a space." Among the most famous geometrical propositions are the fifth and forty-seventh of Euclid's first book of "Elements." The fifth proves that "the angles at the base of an isosceles triangle are equal." It is known as the *pons asinorum*, or "asses bridge," because of the difficulty a dull scholar is supposed to have in getting over it. The forty-seventh proposition, or Pythagoras's theorem, is a brilliant line of reasoning to prove that in a right-angled triangle the square on the hypotenuse is equal to the sum of the squares on the other two sides.

Descriptive geometry is that branch of practical mathematics which obtains representations on plane surfaces of accurately defined bodies in space, for the investigation of their metrical as well as descriptive properties. It differs from ordinary perspective, inasmuch as by the latter method the actual dimensions of a body cannot be ascertained from its representation. In descriptive geometry points in space are represented by their orthographical projections on two planes at right angles to each other, called the planes of projection. It is usual to suppose one of the planes of projec-

tion to be horizontal, in which case the other is vertical; and the projections are called horizontal or vertical according as they are on the one or the other of these planes. Any curve in space will be represented by two curves in the horizontal and vertical planes, and a curved surface by the corresponding representations of certain points and curves on that surface. Thus a plane would be completely defined by its intersections with the planes of projection. The intersections of a line or surface with the planes of projection are called its traces. Again, a sphere may be represented by the projections of its horizontal (or vertical) great circle; a cylindrical surface by its trace on one of the planes of projection, and the projection of any generator on the other; a cone by the projections of its vertex, and by one of its traces, etc. Although applicable to sculpture and all mechanical arts, it is especially useful to civil and military engineering.

Geom'ori, one of the three classes into which the Athenian citizens were divided: the Eupatridæ (=the city nobility), the Geomori (=the country nobility), and the Demiurgi (=the mechanics).

Geophagism (jē-ŏf'ā-jĭz'm), or **Dirt eat'ing,** habit of earth eating which prevails among certain uncivilized nations. Clay for eating is a regular article of merchandise in Bolivia; and the negroes and lower classes of whites in some parts of the U. S. have a similar practice. In Lapland and N. Scandinavia bergmehl is mixed with flour in making bread. Dirt eating is a common habit among the W. Indian blacks, and in the Hudson Bay country among the Indians, where a soft steatite is eaten, probably to allay hunger.

George, name of four kings of Great Britain, who follow: GEORGE I, 1660–1727; first Hanoverian king of Great Britain; b. Osnabrück; son of Ernst August, Elector of Hanover, and great-grandson, on his mother's side, of James I of England. In 1682 he married his cousin, known as Sophia of Celle, from whom, 1694, he was divorced; 1698, he became elector; served against the Danes and Swedes, 1700; held a high command in the war of the Spanish succession, 1701–9; succeeded Anne as sovereign of Great Britain, 1714, in consequence of the exclusion of the Stuarts; was never popular in England, which he in turn disliked, although he served British interests faithfully and with more than ordinary ability; his private character was thoroughly bad. Memorable events of his reign were the first Jacobite rebellion, 1715–16; the failure of the South Sea Co., 1720; the Spanish War of 1726. GEORGE II, 1683–1760; b. Hanover; was throughout life an object of dislike to his father, in consequence of which his education was slighted, and his intellect, not naturally brilliant, suffered from this neglect; married, 1705, the Princess Wilhelmina Carolina of Brandenburg-Anspach, whose remarkable abilities for many years made good the defects of her husband; fought with conspicuous valor at Oudenarde, 1708; succeeded his father, 1727. His reign was singularly adorned by men great in art, letters, war, and diplomacy. The king's fondness for war led him to take command at the battle of Dettingen, 1743, where he won a victory in spite of tactical blunders. Other events of his reign were the battle of Minden, 1739; of Fontenoy, 1745; the second Stuart invasion, 1745–46; the wars of Clive in India; and the conquest of Canada. GEORGE III, 1738–1820; b. London; son of Frederick, Prince of Wales; succeeded his grandfather, George II, 1760; was the first Hanoverian king who had a British education and a deep regard for his country. The annals of his reign of sixty years, the longest in English history excepting that of Queen Victoria (sixty-four years), are replete with great events, among which are the Spanish War of 1762–63; the Wilkes controversy, 1762–82; the passage of the American Stamp Act, 1765; the Junius letters, 1769–72; the American Revolution, 1775–83; the Fox and North coalition, 1783; the French Revolution, 1789, *seq.*; the Irish Rebellion, 1798; and the Napoleonic wars. The king's mind was naturally infirm, and, 1810, a fifth attack of insanity came on and proved incurable. Blindness also supervened, and, 1811, the Prince of Wales became regent. The reign is memorable for great literary and industrial activity. GEORGE IV, 1762–1830; b. St. James's Palace, London; received a careful training; early conspicuous for his loose habits; 1781, joined the Whig opposition to his father's policy; 1791, through misconduct on the turf, got into trouble with his Whig friends, and then became, and ever after remained, a Tory; married Caroline Amelia of Brunswick, 1795, and, 1796, separated from her on the ground of her supposed adultery, for which she was, however, not brought to trial until 1820, and was then acquitted; 1811, he became regent, and, 1820, king. The wars with Napoleon, that of 1812–15 in the U. S., the Roman Catholic emancipation, the conquest of Aracan, and the Tenasserim provinces, the slow but healthy advance of liberal ideas in Great Britain, and, above all, the progress of the physical sciences in England make the reign of George IV one of the most interesting periods of British history. Princess Charlotte Augusta, his only child by his wife, Queen Caroline, and greatly beloved by the English people, was married, 1816, to Leopold of Saxe-Coburg, afterwards King of the Belgians, and died, 1817.

George V, King of Hanover. See CUMBERLAND AND TEVIOTDALE, DUKE OF.

George I, 1845– ; King of Greece, with the title "King of the Hellenes"; b. Copenhagen; second son of Christian IX, King of Denmark. In 1863 he accepted the offer of the crown, King Otho having been deposed. In 1867 he married Olga Constantinovna, daughter of the Grand Duke Constantine of Russia. His children are bred in the Greek faith, but the king is a Lutheran.

George, Prince, 1869– ; second son of George I, King of the Hellenes; b. Corfu, Ionian Islands; entered the Greek navy, 1889;

saved the life of his cousin, afterwards Czar Nicholas II of Russia, when assaulted by a religious fanatic while the two were traveling in Japan, 1891; appointed by the great powers the first High Commissioner in Crete, 1898.

George, Henry, 1839–97; American political economist; b. Philadelphia, Pa.; learned to set type; became a sailor, and went to California, 1858; a reporter, and afterwards editor of the San Francisco *Times*; moved, 1880, to New York City. In 1880–81 he visited the United Kingdom, and became widely known as a writer and lecturer on political economy and social reform. Among his publications are "Our Land Policy" (1871); "Progress and Poverty" (1879), in which he expounded the theory of "single tax"; "The Irish Land Question"; "Social Problems"; "Protection or Free Trade." He was nominated by the Central Labor Convention, 1886, for mayor of New York, but was defeated; was again candidate, 1897, but died a few days before the election.

George, Lake, sheet of water in the State of New York, having Warren Co. on the NW. and Washington Co. on the greater part of its SE. border; length, 33 m.; breadth, ½ m.; discharges into Lake Champlain; sometimes called Lake Horicon, but its Indian name was Caniadericoit; noted for its beauty, being set among mountains, and contains some 300 islands. It was the scene of important military operations during the French and Indian War. Here stood Fort George, Fort William Henry, and other works.

George, Saint, patron of England since 1348; reputed to have been born in Palestine in the third century; became a prince in Cappadocia; was a Christian, and suffered martyrdom at Nicomedia, 303, some say April 23d, for having torn down the edict of Diocletian against Christians, the emperor himself being then in the city. St. George is venerated in the Eastern and Latin churches, and even by the Mohammedans is regarded with great reverence. He is distinguished for his exploit of rescuing a king's daughter from a dragon; but this story is a mediæval invention.

George, Saint, Or'der of. The following are the principal orders which have been founded in honor of St. George: (1) A military order instituted in Russia in 1769 by the Empress Catharine II, as a reward of military achievements. (2) An order instituted in Bavaria by the Emperor Charles VII (Charles Albert) in 1729, and reorganized by King Louis II in 1871; since the reorganization the order, which had previously been a mere decoration for the nobility, has devoted itself to such services as the care of the wounded on battlefields, etc. (3) An order instituted by Ernest Augustus, of Hanover, in 1839. (4) A Sicilian military order, instituted by Joseph Napoleon February 24, 1808, and remodeled by King Ferdinand IV in 1819. (5) The name under which the Order of the Garter was first instituted in England. See GARTER, ORDER OF THE.

George'town, or Demera'ra, capital of British Guiana; on the Demerar River, 1 m. above its mouth, and where the river, 1 m. wide, forms an excellent harbor; is built on low and flat land; is well laid out, with wide streets, but most of the houses are of wood; has an active trade, nearly all the foreign commerce of the colony being carried on through this port. Georgetown was founded, 1774, by the Dutch, who called it Stabroek. Pop. (1903) 53,176.

Georgetown Univer'sity, an institution of learning at Washington, D. C.; founded, 1789, when the first building was begun; classes opened in 1792; chartered by Congress as a university, 1815; astronomical observatory erected, 1845; medical department organized, 1851; law department, 1870. No previous scholastic attainments are required beyond the mere rudiments of knowledge. No distinction is made in the reception of students on the ground of religious belief. The schools of law and medicine are conducted in Washington. Lectures are given in the evening in these schools and are attended largely by government employees. The university has always been directed by the Jesuits; usually has over 700 students, and has grounds and buildings valued at $1,500,000 and a library of over 85,000 volumes.

Geor'gia, former kingdom, comprising the territory S. of the Caucasian Mountains, between the Black and the Caspian seas, and bounded S. by Asiatic Turkey and Persia; now divided into the Russian governments of Tiflis, Kutais, Elizabethpol, Baku, and Erivan. After the death of Alexander the Great the Georgians succeeded in establishing themselves as an independent people; and, although they were conquered and made tributary several times by the Arabian caliphs, by Timur, and by Persia, they maintained a political position as a state until the beginning of the nineteenth century, when Georgia was merged into the Russian Empire. Early in the fourth century (318 A.D.) the Georgians were converted to Christianity, but at present many are Mohammedans. Their language forms a very interesting intermediate link between the Indo-European languages and the monosyllabic tongues of E. Asia.

Georgia (named in honor of George I of England), popularly called the CRACKER STATE; state in the S. Atlantic Division of U. S.; bounded N. by N. Carolina and Tennessee; E. by S. Carolina and the Atlantic; S. by Florida, and W. by Alabama; extreme length from N. to S., 320 m.; extreme breadth, 254 m.; area, 59,475 sq. m.; pop. (1900) 2,216,331. Along the coast and the Florida line the surface is low and swampy; for 20 m. inland the elevation rarely exceeds 40 ft. and averages 10 to 12 ft. above the sea. Then the land suddenly rises till, at Milledgeville, about 150 m. from the sea, the elevation is about 575 ft. From the central part of the state the surface rises into hills till the S. spurs of the Appalachians, the Blue Ridge, etc., are reached, which are 1,200 to 4,000 ft. high. The principal rivers running to the Atlantic are the Savannah, forming the boundary between Georgia and S. Carolina; the Ogeechee and the Cannouchee; the Altamaha, formed by the junction

of the Oconee and the Ocmulgee; the Little Ocmulgee and the Appalachee, Satilla, and the St. Mary's (between which is the great Okefenokee Swamp). SE. Georgia is drained by the Withlacoochee and the Allapaha, uniting in Florida to form the Suwannee; the Ochlochonee, and the Flint and the Chattahoochee, uniting at the Florida line to form the Apalachicola, flow directly into the Gulf. There are numerous islands along the coast, and seven sounds between these and the mainland.

Mineral productions include coal, iron, gold, corundum, asbestos, fire clay, building stones, marble, slate, bauxite, and manganese. The forest growth is red, white, and Spanish oak, hickory, dogwood, poplar, chestnut, and pine; the agricultural products are corn, oats, wheat, rice, clover, grasses, and long and short staple cotton, oranges, lemons, pineapples, bananas,

and olives, peaches, grapes, and watermelons, apples, pears, cherries, plums, quinces, strawberries, and other fruits, tobacco, sugar cane, sorghum, peanuts, and Irish and sweet potatoes. The cutting of lumber and the making of turpentine, mainly from the yellow pine, constitute two of the largest and most profitable industries. Savannah and Brunswick are the largest markets for naval stores in the world. The climate is variable, but exceedingly healthful. Its range embraces quite cold weather, with snow and ice in the mountainous regions and a semitropical temperature in the S. portion. The rainfall for the state averages about 48 in.; the driest part of the year falls in September and October.

The chief manufactures are cotton and woolen goods, cotton-seed oil, iron and steel, flour and grist, tar and turpentine, lumber, naval stores, fertilizers, brick and tile, railroad cars, wagons and carriages, cigars, furniture. Shad fisheries and oyster raising are growing industries; number of factories (1905), 3,219, having an aggregate capital of $135,211,551; value products, $151,040,455. The customs districts are Atlanta, Brunswick, and Savannah; but a large portion of the exports are made through Charleston, S. C.; Fernandina, Pensacola, and Apalachicola, Fla., and Mobile, Ala. The leading educational institutions are the Univ. of Georgia, at Athens, with a branch called the State College of Agriculture and Mechanic Arts, at Auburn; N. Georgia Agricultural College, Dahlonega; Mercer Univ. and Wesleyan Female College, Macon; Emory College, Oxford; Southern Female College, La Grange; Atlanta and Clark univs. and the Georgia School of Technology, Atlanta. There are seven normal schools, a State Institution for the Blind at Cave Spring, and an Academy for the Blind at Macon. The leading religious denominations are the Baptist, Methodist, Episcopalian, Presbyterian, and Roman Catholic. The principal cities and towns are Atlanta (capital), Savannah, Augusta, Macon, Columbus, Athens, Brunswick, Americus, Rome, Griffin, Waycross, Valdosta, Thomasville, Albany, Marietta, Gainesville, Dalton, La Grange, Milledgeville, Elberton, Newnan, Cordele, Washington, Summerville, Cartersville, Barnesville.

The first settlement was made at Savannah, 1733, by Oglethorpe and others; colony surrendered to the Crown, 1752, and negro slavery permitted; Savannah captured by the British, 1778, and held till the close of the Revolutionary War; Augusta and Sudbury captured, 1779; first constitution formed, 1777; U. S. Constitution, 1798; removal of the Creek and Cherokee Indians from the state, 1832, 1838; secession of Georgia, January, 1861. The state was almost constantly the scene of conflict during the Civil War. Sherman's march to Atlanta and thence to the sea were both almost entirely within its territory. Was readmitted to the Union, 1869. The great expositions at Atlanta, 1881 and 1895, gave its agricultural and manufacturing interests a wonderful impulse.

Georgia, Gulf of, body of water between the mainland of British Columbia and Vancouver; an extension of Puget Sound. The Strait of San Juan de Fuca is the S. entrance to the gulf and to Puget Sound; Queen Charlotte's Sound is the N. entrance. The gulf is a sound or channel, rather than a gulf, is 100 m. long, and in some places 20 m. broad.

Georgia, Univer'sity of, coeducational, nonsectarian institution at Athens, Ga.; chartered 1785, and opened 1801; comprising, besides a college of liberal arts (Franklin College), a School of Medicine at Augusta, a School of Technology at Atlanta, a School of Law, and State Agricultural colleges in Dahlonega, Thomasville, Milledgeville, and Hamilton, and a Normal and Industrial College for Women. Tuition is free except in the schools of law and medicine. There are usually over 3,000 students in all departments.

Geor'gian Bay, extreme E. portion of Lake Huron, province of Ontario, Canada, and separated from the rest of the lake by Grand Manitoulin Island and by the Bruce peninsula. The bay, which was formerly called Lake Manitoulin, contains thousands of small, picturesque islands; length, 120 m.; breadth, 50 m.

Gepidæ (jĕp'ĭ-dē), people of Germanic origin; first found at the mouth of the Vistula in the third century; by the fifth they had

ved to the lower Danube, where the Huns subjugated them; by revolt recovered their freedom and congregated at Dacia; became sufficiently strong to levy tribute from the Byzantine emperors; met a crushing defeat, 566, when the majority went to Italy with the Lombards; since lost to history.

ld de Barr'i. See GIRALDUS CAMBRENSIS.

a'nium Fam'ily, group of about 1,000 showy herbaceous species of dicotyledonous

SCARLET GERANIUM.

owering plants, with superior compound vary, few ovules, and distinct petals. The pecies are found mainly in temperate and sub-

HORSESHOE GERANIUM.

tropical climates. *Geranium*, with 110 species, and *Oxalis*, with 205 species, have a world-wide distribution. *Pelargonium*, which includes the "geraniums" of the greenhouses, is a S. African and Australian genus of nearly 200 species. Geranium is the name popularly given to the cultivated species and varieties of *pelargonium*. The genus *pelargonium* differs from *geranium* in several respects, the most obvious of which are the half-shrubby stems and the somewhat irregular flowers. There are no more popular tender plants than the various pelargoniums, whether for window culture, summer bedding plants, or choice ornaments to the conservatory and greenhouse. Though the name geranium applied to them is incorrect, it has become so firmly attached that no change is probable. Florists' pelargoniums, or show pelargoniums, as they are sometimes called, have rounded leaves and flowers, often somewhat irregular, of the greatest beauty of color and markings. This class is only seen in perfection in greenhouses, and it requires great care and skill to make a fine show of them. The old scarlet geranium, *P. inquinnans*, and the horseshoe geranium, *P. zonale*, are the principal species from which this class originated; the flowers range from white to the most dazzling scarlet and dark crimson.

Gérard (zhā-rär'), **Étienne Maurice** (Count), 1773–1852; French military officer; b. Damvillers; distinguished in many of Napoleon's principal battles; general of division, 1812, after the battle of Borodino, and in 1813, after the victory of Bautzen, a count of the empire. He commanded the Army of the Moselle, 1815; returned to France 1817; was war minister and marshal, 1830; reduced Antwerp, 1832; a peer of France, 1832; Prime Minister, 1834; commander of the National Guard, 1838; Senator, 1852.

Gérard de Nerval', the pseudonym of GÉRARD LABRUNIE; 1808–55; French author; b. Paris. First published a series of poems called "Élégies Nationales," and which attracted some attention on account of their controversial character. Translated Goethe's "Faust," which the old poet himself pronounced a marvel of style, and from which Berlioz borrowed some of the choruses in his "Damnation of Faust." He also wrote some original dramas, and was a steady contributor to the *Presse* and the *Revue des Deux Mondes*; toward the close of his life he became insane, and he finally committed suicide in Paris.

Gérard, François Pascal (Baron), 1770–1837; French historical and portrait painter; b. Rome, of French parents; executed important works for Napoleon, who appointed him official portrait painter; patronized by Louis XVIII and Charles X; created baron, 1819. Several large canvases, including "The Battle of Austerlitz" and portraits, are in the Versailles Museum.

Ger'asa (Arabian JERASH), ruined city of Palestine; 55 m. NE. of Jerusalem; divided by the Kervan River; one of the ten cities of Decapolis; most interesting of its remains comprise a Corinthian temple and triumphal arch, five or six other temples, and two theaters, all of marble; a naumachia, or artificial basin for

the representation of sea fights; and a small temple, with a semicircular Ionic colonnade from which a street, lined with rows of columns, traverses the city. At right angles with this are three other streets, all full of relics of ancient greatness. Josephus says that King Alexander Jannæus captured Gerasa abt. 85 B.C. It was burned by the Jews in their war with the Romans, and was taken again by Annius, one of Vespasian's generals. Baldwin II captured it and destroyed its castle, 1122.

Gerberon (zhĕrb-rȯn'), **Gabriel,** 1627–1711; French theologian; b. St. Calais, Sarthe; entered the Benedictine congregation of St. Maur, and taught philosophy; espoused Jansenism in his "Mirror of Christian Piety," 1676, and was forced by the Jesuits to flee for his life; lived in the Netherlands for twenty-five years, and there published "General History of Jansenism"; arrested in Brussels, 1703, and imprisoned until he recanted; shortly before his death recalled his recantation.

Gerbil (jĕr'bĭl), a genus of ratlike rodents, found mostly in Asia, Africa, and E. Europe. They are all nocturnal, living in burrows, where they store away much grain. They generally secrete an offensive odor. They are elegant and active, and generally of a fawn color.

Gerbo'a. See JERBOA.

Ger'falcon. See FALCON.

Gerhard (gĕr'härt), **Eduard,** 1795–1867; German archæologist; b. Posen, Prussia; a professor at Breslau; 1828–37, director of the Institute of Archæological Correspondence at Rome; later Prof. in the Univ. of Berlin and archæologist of the Royal Museum; author of works on Italian, Greek, and Etruscan archæology.

Gerhard, Johann, 1582–1637; German theologian; b. Quedlinburg, Saxony; was superintendent-general of Saxe-Coburg, 1606–16; went to Jena as Prof. of Theology. His "Loci Communes Theologici" is the fullest exposition of Lutheran theology. His "Meditationes Sacræ" is a devotional work, collecting the choicest sentences from patristic and mediæval writers. He wrote a very extensive controversial work against Roman Catholicism, entitled "Confessio Catholica," and completed the "Harmony of the Gospels," begun by Chemnitz and continued by Lyser.

Gerhardt (zhā-rär'), **Charles Frédéric,** 1816–56; French chemist; b. Strassburg; professor at Montpellier, 1844–48; Prof. of Chemistry and Pharmacy at Strassburg, 1855–56. Wrote on organic chemistry. Gerhardt's immortality rests on the reform in chemical notation inaugurated by him.

Gerhardt (gĕr'härt), **Paul,** 1607–76; German hymn writer; b. Gräfenhainichen, Saxony; pastor at the Church of St. Nicolai, Berlin, 1657; for refusing to subscribe to edicts which he considered as attempts to unite the Lutheran and Reformed churches, was dismissed, 1666, but was made archdeacon of Lübben, 1667; wrote 131 hymns, of which the best known is "O Sacred Head, now Wounded."

Gericault (zhā-rē-kō'), **Jean Louis André Théodore,** 1790–1824; French animal and figure painter; b. Rouen; pictures include "Guide of the Imperial Guard," "The Wounded Cuirassier," and "Raft of the Medusa," one of the masterpieces of the French school.

Ger'izim and **E'bal,** mountains of W. Palestine, about halfway between Jerusalem and Nazareth; face each other across a narrow valley, in which stands the town of Nablous, the ancient Shechem or Sychar. Gerizim, on the S. side of the valley, is 2,849 ft. above the sea; Ebal, on the N. side, 3,077. Here was Abraham's first encampment W. of the Jordan (Gen. xii, 6), and here the Law was solemnly read in the hearing of the twelve tribes (Josh. viii, 30–35). Gerizim is the sacred mountain of the Samaritans, where the handful that survive (less than 130 in all) still observe the three great festivals of the Mosaic ritual.

Germa (ghĕr'mä), city in that part of Phrygia which afterwards became Galatia; was a Roman colony, called Colonia Julia Augusta Felix, and Latin inscriptions bearing this name prove that Masutkieui on the Lower Tembris occupies the site of Germa.

Ger'man Cath'olics, sect in Germany which, 1844, seceded from the Roman Catholic Church in consequence of the exhibition of "the holy coat" at Treves. The dominant element was rationalistic, represented by Johannes Ronge, a deposed Roman Catholic Silesian priest. The weaker evangelical element was represented by Johann Czerski, another Roman Catholic priest of Posen, who had left the Church. The first congregation was organized, 1844, by Czerski himself at Schneidemühl, under the name of "Christian Catholic." The first creed put forth was the "Confession of Schneidemühl," drawn up by Czerski, and differing but little from the Roman Catholic faith. It appealed to Scripture and accepted the Nicene Creed, rejecting indulgences, purgatory, invocation of saints, the Latin mass, communion in one kind, auricular confession, clerical celibacy, the papal supremacy, and some other points. The "Confession of Breslau," drawn up by Ronge, was less conservative and orthodox. The creed adopted by the council which met at Leipzig March 22, 1845, was substantially Ronge's Confession of Breslau. At this time there were more than 100 congregations, and by the end of the year nearly 300. Meanwhile, another sect, called "Free Congregations," had arisen, and the two came together at Gotha, 1859, under the name of "Bund freireligiöser Gemeinden." Governmental hostility, internal divisions, and "Old Catholicism" worked together against the movement, and to-day there are less than 5,700 adherents.

German East Af'rica, largest of the German protectorates; bounded N. by British E. Africa, E. by the Indian Ocean, S. by Mozambique, Lake Nyasa, and British Central Africa, W. by Lake Tanganyika and the Kongo Free State; area about 384,000 sq. m.; coast line about 620 m., extending from the mouth of the Umba to Cape Delgado on the S. The greater part of Lake Victoria Nyanza lies

within the protectorate. The best harbor is Dar es Salaam, about 50 m. S. of Zanzibar. The W. part is mountainous, salubrious, and fertile. Coal, iron, lead, copper, gold, mica, and salt are found. Cotton, coffee, tobacco, sugar, tea, and caoutchouc are among the products. The German Empire is represented in the protectorate by an imperial governor. The native population, mostly of tribes of Bantu race, is estimated at 6,700,000; the European population at 1,875. In 1884 the German Colonization Society obtained territorial rights by treaties with native chiefs in the mountains and highlands back of the coast; soon after, Germany declared a protectorate over these regions. In 1885 these rights passed to the German E. Africa Company. A coast strip was obtained from the Sultan of Zanzibar, 1890. By treaty, 1886, 1890, Germany and England defined their respective spheres of influence.

German Em'pire, The, empire established 1871 by the union of the German states of Central Europe under the leadership of Prussia; consists of the kingdoms of Prussia, Bavaria, Saxony, and Württemburg; the grand duchies of Baden, Hesse, Mecklenburg-Schwerin, Saxe-Weimar, Mecklenburg-Strelitz, and Oldenburg; the duchies of Brunswick, Saxe-Meiningen, Saxe-Altenburg, Saxe-Coburg-Gotha, Anhalt; the principalities of Schwarzburg-Sondershausen, Schwarzburg-Rudolstadt, Waldeck, Reuss Aeltere Linie, Reuss Jüngerer Linie, Schaumburg-Lippe, Lippe; the free towns of Lübeck, Bremen, and Hamburg, and the Reichsland of Alsace-Lorraine. The empire is bounded N. by the North Sea, Denmark (Jutland), and the Baltic; E. by the Russian Poland and Galicia; S. by Austria and Switzerland; W. by France, Luxembourg, Belgium, and the Netherlands; area, 208,780 sq. m.; pop. (1905) 60,641,278. The various foreign possessions include Togoland, on the Slave Coast (33,700 sq. m., 1,500,000 inhabitants); Kameruns, in the Gulf of Guinea (191,130 sq. m., 3,500,000 inhabitants); German SW. Africa (322,450 sq. m., 200,000 inhabitants); German E. Africa (384,180 sq. m., 6,703,000 inhabitants); N. New Guinea, or Kaiser Wilhelmsland; the Bismarck Archipelago; the Caroline Islands; part of the Samoan Islands; several of the Solomon Islands and the Marshall Islands, in the Pacific, and Kiauchau Bay, in China. The total for these dependencies is 1,027,820 sq. m., with 12,378,000 inhabitants.

The vertical configuration of Germany presents the Alpine region S. of the Danube, the elevated and terraced central portion, and the level N. country. Only two comparatively small branches of the Alps (the Algau Alps and the Bavarian Alps) belong to the German Empire. The terraced country of central Germany has its nucleus near the junction of Saxony, Bohemia, and Bavaria, in the Fichtelgebirge. To the SE. runs the Bohemian Forest, and to the NE. the Erzgebirge, which beyond the Elbe turns SE. and is called the Sudetic Mountains (Riesengebirge, Glatzergebirge). SW. of the Fichtelgebirge the Franconian Jura sweeps to the Danube and into Württemburg. In SW. Germany the Black Forest extends nearly parallel to the Rhine. Between the Franconian and Swabian mountain system and the Rhaetian Alps of Austria extends a vast level plain. The NW. section of central Germany appears like a labyrinth of hill chains. The great plain of N. Germany undoubtedly once formed the bottom of the sea. The coast of the North Sea, or German Ocean, is largely indented by deep bays, and its "marshes" are the most fertile soil in Germany; but its maritime advantages are neutralized by sand banks which stretch along the coast. The shores of the Baltic form extensive lagoons, and are generally sterile. The principal river systems of Germany are those of the Danube, Rhine, Weser, Elbe, and Oder. Other rivers flowing directly into the sea are the Eider, the Pomeranian rivers Rega, Persante, Wipper, Stolpe, Lupow, and Leba, and the Vistula. Several of the large river systems are connected by canals, the most important of which are the Baltic and North Sea (Kaiser Wilhelm) Canal, connecting the Bay of Kiel with the Elbe, and the Ludwig Canal, between the Danube and the Main, uniting the navigation of the North and Black seas. Germany has many lakes, but most of them are small. The climate is temperate, and, considering the extent of the country, remarkably uniform. The mean annual temperature of all Germany is 48.8° F. The extremes of temperature in the country N. of the Alps are 95° F. above and 31° F. below zero.

Mineral products abound. Among its metals are gold, silver, iron, tin, lead, cobalt, calamine, and zinc. Extensive coal beds occur in Rhenish Prussia, Westphalia, upper Silesia, Saxony, Anhalt, and other divisions; peat is plentiful in the NW. districts; salt, sulphur, saltpeter, alum, gypsum, chalk, ochre, emery, porcelain clay, graphite, marble, alabaster, and amber (on the shores of the Baltic) are found in different districts. Of the many mineral springs, Baden-Baden, Kissingen, Nauheim, and Hamburg enjoy a world-wide reputation. The soil, on the whole, is only of a moderate fertility. Flax and hemp, madder, woad, and saffron are cultivated in the S. and central region. Tobacco is raised on the upper Rhine, the Werra and Oder, and in Brandenburg. Excellent hops are furnished by Bavaria and Brunswick. Beets are raised in enormous quantities for making sugar. The vine yields her choicest juice on the slopes of the Taunus in the Rheingau. The breeding of horses, cattle, and sheep is an important industry, and the culture of forests is conducted on a more scientific basis than in any other country.

Over 282,700 men are employed in the production of iron, and some 522,800 in coal and lignite mining. The average annual production of rock salt exceeds 800,000 tons. The principal seats of iron manufactures are in Prussia, Alsace-Lorraine, Bavaria, and Saxony. Essen, Bochum, and Witten are noted for their steel works. Saxony leads in the production of textiles. Cloth making is carried on principally in Rhenish Prussia, S. Brandenburg, Lusatia, W. Saxony, and Alsace. Rhenish Prussia, Alsace, and Baden produce

silks and velvets; Silesia, Thuringia, and Saxony, glass, porcelain, and earthenware; Württemburg and Bavaria, clocks, wooden ware, toys, etc.; Bavaria and Prussia, beer; Prussia, Brunswick, and Anhalt lead in the production in beet-root sugar; Prussian Saxony and Anhalt in chemicals and dyestuffs; Rhenish Prussia and Westphalia in paper. Excellent leather comes from Mainz and Worms; Cologne is noted for its perfumery, and Offenbach, Nuremburg, and Berlin for fancy goods. The commerce of Germany is under the administration and guidance of the *Zollverein*. Until 1879 a free-trade policy was pursued. All transit duties were abolished, 1861, and export duties, 1865; value of imports (1905), $1,649,510,000; exports, $1,368,980,000. The imports include cereals and other agricultural produce; the exports, woolen, goods, cotton goods, silks, leather, drugs and colors, earthenware and glass, iron, machinery and implements, sugar. Germany imports mainly from Great Britain, N. and Central America, Russia, Austria-Hungary, S. America and the W. Indies, France, Algeria, Tunis, and British India; and imports to Great Britain, Austria-Hungary, N. and Central America, Netherlands, Russia, and Switzerland. The commercial navy comprises some 4,430 sailing vessels and steamers, with aggregate tonnage of 2,629,093. The principal ports are Hamburg (with Cuxhaven), Bremen (with Bremerhaven), Stettin, Danzig, Königsberg, Memel, and Altona.

In 1900 the population included 35,231,104 Protestants, 20,327,913 Roman Catholics, 203,793 Christian sectarians, 586,948 Jews. The relations between Church and State are intimate, and the ministers of Roman Catholic as well as of Protestant congregations are in receipt of subsidies from the government. Education is compulsory. It is more backward in the provinces of Prussia, most advanced in Württemburg, Baden, the old free towns, and some of the minor states. Most of the elementary schools are denominational. There are 256 seminaries for the training of teachers. The number of secondary schools, including gymnasia, realschulen, and private schools is abt. 1,340. Technical and industrial schools include 9 polytechnic high schools, 3 agricultural high schools, 9 schools of forestry, 27 of art and art industries, 15 of architecture and building, 15 of mining, 429 commercial schools, 7 music conservatories, a naval college at Kiel, military academies at Berlin and Munich, 19 navigation schools, and many others. Of universities there are 21, those of Berlin, Leipzig, and Munich having the largest number of students.

The constitution of the empire dates from April 16, 1871, and has since been modified in several respects. The empire is a federal state, and not a federation like the defunct *Bund*. The imperial dignity is hereditary in the House of Hohenzollern. The emperor merely enjoys an executive authority, which he exercises in the name of the empire or of the confederate governments. Laws are enacted by the *Bundesrath* and the *Reichstag*; the emperor has no veto. The *Bundesrath*, or Federal Council, numbers 58 members (17 for Prussia), who are appointed by the governments of the individual states, and vote according to instructions. The *Reichstag* numbers 397 members, elected for five years by universal suffrage, all males of twenty-five years of age having votes, except soldiers with the colors. Its members are not paid. The *Reichsgericht*, the judges of which are appointed by the emperor, is the supreme court of justice and of appeal for the whole empire. All other courts are state courts, but the appointment of the judges, as well as their practice, must conform to imperial legislation. Small civil cases are decided by a single judge in the *Amtsgericht*; above this is the *Landesgericht*, and finally the *Oberlandesgericht*, the highest of all the state courts. Commercial cases may be dealt with by arbitrators or experts, presided over by a judge. The same courts or judges deal with misdemeanor or crime. Minor offenses are dealt with by a *Schöppengericht*, a court presided over by one judge and two *Schöppen*, or assessors, elected by the rate-payers. Serious crimes are adjudged by a jury.

The army is headed by the emperor, assisted by his military cabinet. The Prussian, Saxon, and Württemburg ministries of war direct the forces of these states, forming the imperial army, of which the command is exercised through the great general staff. By law of 1905, every German fit to bear arms belongs for seven years to the regular army; during the five following years to the first levy of the Landwehr, and then, up to March 31st of the year in which he completes his thirty-ninth year, to the second levy. Men belonging to the cavalry and horse artillery during their period of service in the regular army spend three years without interruption with the colors. The annual strength on a peace footing has been increased till by 1909 it consisted of 619,000 men. The war strength is approximately 4,330,000 men, including the field army and its reserve formations, 1,760,000; the Landwehr, 1,840,000; trained men of the Landsturm, 800,000; and 30,000 trained men of the Ersatz reserve, in which the period of service is twelve years. The empire has 17 fortresses of the first class, serving as fortified camps, and 10 others. The navy is under the supreme command of the emperor, with a naval cabinet, having a flag officer at its head. The chief naval stations are Kiel on the Baltic and Wilhelmshaven on the North Sea. The number of men and officers on the active list, 1906, was 43,654; the strength in ships built and building was 256, of which 26 were battleships of the first class.

In 1905 there were only 41 towns having over 100,000 population. The largest (1905) were Berlin, Hamburg, Munich, Dresden, Leipzig, Breslau, Cologne, and Frankfort on Main. Of the total population (1900), 54.3 per cent lived in towns of 2,000 inhabitants and above. German is the mother tongue of the bulk of the population, and is spoken in a number of dialects, namely, Frisian, Low German and Upper German, the language of culture being

known as High German (*Hochdeutsch*). The leading German "tribes" are the Frieslanders, Saxons, Franks, Swabians, Allemannes, and Bavarians, including Austrians. The principal non-German-speaking inhabitants are the Poles, Lithuanians, Czechians and Wends, and Danes.

At the time of the conquest of Gaul, Germany was occupied by more than fifty tribes. After the withdrawal of the Romans, Germany gradually became united with the Frankish empire of Clovis (481–511) and his successors. Among these, Charlemagne (771–814) consolidated the empire, and extended his rule from the Ebro in Spain to the Elbe in the NE., the Raab (Hungary) in the E., and beyond the Po in Italy. In 1843 the empire was divided into three parts, later known as Italy, France, and Germany, Germany falling to Louis. When the Carlovingian dynasty became extinct (911), Germany consisted of a number of great territories (duchies), the rulers of which, together with their most powerful vassals, elected the king. Henry I (919–936), the founder of the Saxon dynasty, restored the empire by victories over the Danes, Slavs, and Magyars. The Saxon dynasty ruled till 1024, during which time Burgundy was conquered, and was succeeded by the Franconian. The dynasty of the Hohenstaufens (Suabians) succeeded, and gave to the country five sovereigns. The reign of the Hohenstaufen dynasty represents the most glorious period of German history during the Middle Ages. To conquer Italy and to break the temporal power of the pope were the great objects of the emperors of this house. Anarchy prevailed from 1250 to 1273, when Count Rudolph of Hapsburg was elected king, thus establishing the Hapsburg dynasty. He reëstablished the royal authority, and obtained Austria, Styria, Carinthia, Carniola, and Tyrol. Under the reign of Maximilian I (1493–1519) the Reformation was begun by Luther. Under Maximilian's grandson, Charles V, who united the crowns of Spain, the Netherlands, Germany and Naples, Germany once more became the ruling power of Europe. The Thirty Years' War (1618–48) left the imperial authority completely shattered.

From the time of Leopold I (1658–1705) the title of German emperor appeared only as an empty surname of the rulers of Austria, and Germany was a maze of little despotisms. Prussia, a kingdom since 1701, through the genius of Frederick the Great established a great Protestant power, able to cope with Austria. The French Revolution prostrated the tottering fabric of the German Empire. In 1806 the Rhenish Confederation was formed under the protectorate of Napoleon, the Emperor Francis resigned the German crown, and the empire was formally dissolved. With the exception of Austria and Prussia, nearly the whole of Germany was reduced to French vassalage. In 1815 those states which had maintained their sovereignty during the Napoleonic troubles formed a confederation (*Deutscher Bund*). The establishment of the Zollverein united many of the German states on the basis of common material interests and laid the foundation for national unity. Popular demands growing out of the Revolution of 1848 caused the convoking of a provisional self-constituted assembly (*Vorparliament*), which formed a provisional national government, consisting of a vicar of the empire and a ministry. A party aiming to exclude Austria from the new empire prevailed, and elected the king of Prussia German emperor, 1849, but he declined the dignity. A provisional regency followed. Prussia now attempted to obtain the mastership, and assembled a parliament of petty states too powerless to resist its demands, which adopted a sort of federal constitution.

A struggle with Austria for supremacy ensued, leading up to the war over the succession to the duchies of Schleswig and Holstein, 1864, and to the cession of those duchies and Lauenburg to Austria and Prussia jointly. Another war, 1866, resulted in the victory of Prussia and the annexation of Schleswig and Holstein. Austria was now excluded from Germany, and the North German Confederation was formed of the states N. of the Main, under the King of Prussia. Schleswig-Holstein, Hanover, Hesse-Cassel, Nassau, and Frankfort were incorporated with the kingdom. The demands of France brought on the War of 1870, in which the S. German states, Austria excepted, aided those of the N. By this war Germany acquired Alsace-Lorraine. In January, 1871, the S. German states united to reëstablish the German Empire under the King of Prussia as German emperor—"*Deutscher Kaiser*," not Emperor of Germany. The leading events since that time were the formation of a Triple Alliance with Austria and Italy, the increase of the army and navy, the spread of socialism and antisemitism, the conflict with the Ultramontane Party, the rivalry with England, the adoption of a protectionist policy, 1879, the rise of Germany as a colonizing power, 1884, the entry into China, 1897, the disastrous and costly war with the natives of German SW. Africa, 1904–7, the tilt with France over their respective interests in Morocco, 1905–6, and the tariff controversy with the U. S., beginning 1905.

German Lit'erature, received its first impulse from the fondness of the early Germanic races for celebrating the deeds of their gods and heroes. According to Tacitus, the warriors would advance to attack chanting wild war songs, with their shields held close to the mouths, which added to the discordant effect of the unknown and uncouth tongue. Of these early songs nothing, even in a translated form, has been handed down to us. The legends immediately connected with the Gothic, Frankish, and Burgundian warriors of the period of national migration—Dietrich (Theodoric), Siegfried, Hildebrand, etc.—have for the most part some historical foundation, and many of them were eventually incorporated in the Nibelungenlied, the most celebrated production of German mediæval poetry. On the introduction of Christianity was opened another sphere of literary activity. Metrical translations of the Evangelists, the "Krist" and "Heliand," appeared in the ninth century in the High and

Low German dialects, respectively. The "Ludwigslied," a pæan in honor of the victory of Louis III, King of the Franks, over the Normans in 883, was composed in Old High German by a Frankish ecclesiastic. The preservation of the "Hildebrandlied" is also due to churchmen, who transmitted it partly in the High and partly in the Low dialect. The "Merseburger Gedichte," two songs of enchantment written in the tenth century, throw light on the ancient religious beliefs of Germany; but in general the hostility of the clergy to the old pagan literature of heroic legends, beast fables, etc., was not favorable to its preservation.

In the twelfth and thirteenth centuries poetry passed from the monasteries and ecclesiastical schools to the palaces of princes and the castles of nobles. Under the cultured emperors of the house of Hohenstaufen the first bloom of German literature came. Many of the poets of this period were nobles by birth, some of them even princes. Heinrich von Weldeke was the first to introduce into his heroic poem Eneit, that spirit of devotion to women called by the old Germans *Minne* (love, hence the name *Minnesänger*, love minstrel). A still greater name is that of Wolfram von Eschenbach, the author of "Parzival," a poem embodying the legends of King Arthur, the Knights of the Round Table, and the San Graal (Holy Grail). These traditions, together with the exploits of Charlemagne, of Alexander the Great, and the Trojan heroes, inspired also the lays of Gottfried of Strassburg, Hartman von der Aue, and others. These subjects were all taken from the romances of the French *trouvères*, and treated in a style closely resembling theirs. But we have, besides, real national epics in the "Nibelungenlied" and "Gudrun." The lyrics or minnesongs of this period are not less remarkable than its romances and epics. Perhaps the most gifted lyrist is the celebrated Walther von der Vogelweide. Next to him rank Heinrich von Ofterdingen, Reinmar der Alte, the Austrian poets Nithard and Tannhäuser. Several hundreds of these poets were engaged in traveling from palace to palace and from castle to castle. Their songs were mostly in the Suabian dialect, and the poets constituted what is called the Suabian school. In the thirteenth century didactic poetry began to be cultivated with some success. The dawn of historical literature is heralded by the chronicles of Limburg (1336–98) and of Alsace (1386), but the age of chivalry, as Ulrich von Lichtenstein complained in his poem "Frauendienst," was declining. During the troublous times of the Interregnum (1256–73) poetry passed to the homes of the private citizen and the workshops. These plebeian songsters formed themselves into guilds in the imperial cities—Nürnberg, Frankfort, Strassburg, Mainz, etc.—and were called *Meistersänger*, in contradistinction to the knightly *Minnesänger*.

In the fourteenth century Germany produced several mystical theologians, disciples of Meister Eckhart, the most celebrated of whom were Tauler and Suso, whose sermons and writings paved the way, in some measure, for the Reformation. The only good poetry in the fourteenth and up to the close of the fifteenth century were the spirited lays of Halb Suter and Veit Weber, who celebrated the victories of Switzerland over Austria and Burgundy. The invention of printing caused an increasing literary activity, and the works printed in Germany between 1470 and 1500 amounted to several thousand editions. In 1498 there was published the celebrated beast epic, "Reineke Vos" (Reynard the Fox). Other popular works were the "Narrenschiff" (Ship of Fools) of Sebastian Brandt, an allegorical poem in which the vices are satirized; the "Satires" of Thomas Mürner; and (in 1519) "Till Eulenspiegel," a collection of humorous stories about a wandering mechanic.

In the sixteenth century a new era opens in literature with Luther's translation of the Bible. The writings of Luther, Zwingli (1484–1531), Sebastian Frank (1500–45?), Melanchthon (1497–1560), Ulrich von Hutten (1488–1523), one of the chief writers of the "Epistolæ Obscurorum Virorum," constitute the principal theologic literature of the Reformation. History was now written in a superior style, and with greater comprehensiveness, by Frank in the "Zeitbuch" and "Weltbuch," and by Sebastian Münster (1489–1552) in his "Kosmographie"; also by Tschudi (1505–72) in "Chronicles of Switzerland," and by Aventinus (1477?–1534), the Bavarian chronicler. The autobiography of Götz von Berlichingen also deserves mention as a sketch of the rude lives of the smaller nobility. Among the poets of this period Hans Sachs (1494–1576), the cobbler of Nürnberg, the greatest of the Meistersänger, and Johann Fischart, a great satirist, and author of "Das Glückshafte Schiff," stand much above their contemporaries. Many of the hymns and religious lyrics of the age are of high merit, particularly those of Luther, Eber, Waldis, and others. The drama also made considerable progress, Hans Sachs, before mentioned, and Jakob Ayrer being among the best writers in this department. But it was in learned and scientific treatises that the age was most prolific. Among the chief names in this respect are Luther, Camerarius, Cornelius Agrippa, Paracelsus, Copernicus (astronomy), Leonhard Fuchs (botany and medicine), Conrad Gesner (zoölogy and classics), and Agricola (mineralogy).

By the beginning of the seventeenth century literature was on the decline. This century is known in German literature as the period of imitation. Most of the poets were graduates of universities; and learned societies were formed for the purpose of improving the language and literature. A new school of poetry, known as the first Silesian school, was founded, of which Martin Opitz (1597–1639) was the leader. His works are more remarkable for smoothness of versification than for true poetic inspiration. As a critic, his work, "Die Deutsche Poeterie," became a kind of manual for verse makers. Among the chief members of the Silesian school were Simon Dach (1605–69), Von Zesen (1619–89), Johann Rist (1607–67), and, greatest of all, Paul Fleming (1609–40), whose lyrics are natural and cheerful as

the songs of a lark. Of this school also was Andreas Gryphius (1616–64), who may be said to have founded the regular German drama. The second Silesian school, headed by Hoffmann von Hoffmannswaldau (1618–79) and Lohenstein (1635–83), carried affectation to its utmost. Both the Silesian schools were opposed by the "court poets," Canitz (1654–99), Besser (1654–1729), and many others who imitated the French school and took Boileau for their guide. Germany's greatest hymn writer, Gerhardt (1606–75), belongs to this period. Among the best satirists and epigrammatics were Logau (1604–55) and Laurembergh (1591–1659). Among novelists, Moscherosch, with his "Geschichte Philanders von Sittewald" and "Grimmelshausen," in his "Simplicissimus," give graphic pictures of life during the Thirty Years' War. Among the scientific and philosophic writers of the period we may mention Kepler (1571–1631), Puffendorf (1632–94), the publicist, and Jakob Böhme (1575–1624), the great mystic who stood almost alone in using the vernacular in communicating philosophical instruction. Leibnitz (1646–1716) was the first to lay a scientific basis for the study of philosophy, but his works were composed chiefly in French and Latin. Wolff (1679–1754), his disciple, shaped the views of his master into a comprehensive system, and published his works in the German language.

In the eighteenth century poetry revived, with Haller (1708–54), remarkable as a descriptive poet, and Hagedorn (1708–54), a lyrist of considerable merit. The Saxon school, headed by Gottsched (1700–66), aimed at a reformation of German poetry in the direction of French clearness and correctness, modeling the drama, as far as possible, on the works of Corneille and Racine. These tendencies brought about a violent controversy with a group of writers in Zürich, known as the Swiss school, and headed by Bodmer and Breitinger, who took the English poets as their model, and laid stress on the function of imagination and feeling in poetry. The result of the controversy was that most of the young writers at Leipzig shook off the authority of Gottsched, and even established a periodical (*The Bremer Beiträge*), in which the principles of their former master were attacked. Among the contributors were Rabener (1712–91), a popular satirist with a correct and easy style; Zachariä (1726–77), a serio-comic epic poet; Gellert (1715–69), the author of numerous popular hymns, fables, and a few dramas now forgotten; Kästner (1719–1800), a witty epigrammatist and talented mathematician; Giseke, Cramer, Fuchs, Ebert, and many others of more or less note. To the school of Halle belonged Kleist (1715–59), Gleim (1719–1803), a celebrated fabulist, and others. Gessner of Zürich (1730–87) gained in his time a high reputation as a writer of idyls. With the writings of Klopstock (1724–1803) and Wieland (1733–1813) the classical period of German literature (usually reckoned from 1760) may be said to begin. Though the epic poem of the first (Messias) is no longer counted a poem of the first rank, yet Klopstock's work, with its ardent feeling for the spiritual and sublime, is recognized to have had a beneficent effect on German literature. Wieland, a striking contrast to Klopstock, awakened with his light and brilliant verse a greater sense of gracefulness in style. But it was reserved for Gotthold Ephraim Lessing (1729–81) to give a new direction to German literature. He established a new school of criticism and dealt the fatal blow at French influence. His tragedy, "Emilia Galotti," his comedy of "Minna von Barnhelm," and his philosophic drama, "Nathan der Weise," were the best models of dramatic composition which German literature had yet produced, and his direction of the German mind toward Shakespeare and the English drama was not the least of the many impulses he contributed to the literary growth of his countrymen. Herder (1744–1803), with his universal knowledge and many-sided activity, followed Lessing as another great influence in the literary world. The researches of Winckelmann (1717–68) in ancient sculpture led to a new understanding of art, as those of Heyne in ancient literature mark the development of modern German scholarship. A union of the students at Göttingen Univ., where Heyne taught, gave rise to the *Göttinger Dichterbund* or *Hainbund*, among the members of which were Gottfried Aug. Bürger (1748–94), author of "Lenore" and other wild and picturesque ballads and songs; Voss (1751–1826), the translator of Homer and author of one of the finest German idyls, "Luise"; together with the two brothers Stolberg, Boie, Hölty, Claudius, etc.

This period was followed by a time of transition and excitement known in Germany as the *Sturm-und-Drang Periode* (Storm and Stress period), which found its fullest expression in an early work of Goethe's (1749–1832), the "Sorrows of Werther." The literary excitement was raised to the highest pitch by "Die Räuber" (The Robbers) of Schiller (1759–1805), afterwards the friend and coadjutor of Goethe. By the joint exertions of these two great men German literature was brought to that classical perfection which, from a purely local, has since given it a universal influence. Of a highly individual character are the works of Jean Paul Richter (1763–1825), a writer of profound humor and pathos, and Jung Stilling (1740–1817), whose autobiography holds a peculiar place in German literature for the charming naïveté of its thought and style. In the departments of science and philosophy we have the names of Moses Mendelssohn (1729–1786); A. G. Baumgarten (1714–62), the founder of the science of æsthetics; the historians Mosheim (1694–1755), Dohm, Möser, Spittler, Johannes Müller; Adelung the philogist; Basedow and Pestalozzi, the educationalists; Earnesti, Spalding, Rosenmüller, and Michaelis, theologians; Eichhorn in theology and universal and literary history; and the scientific writers, Blumenbach, Euler, Vega, Herschel, and others. In the field of pure metaphysics, Immanuel Kant was succeeded by Fichte (1762–1814), Hegel (1770–1831), and Schelling (1775–1854).

Partly produced by the influences of the

Sturm-und-Drang period, and partly trained in the laws of art laid down and worked out by Goethe and Schiller, the so-called *romantic school*, distinguished by its enthusiasm for mediæval subjects and its love of what is mysterious and transcendental in life or thought, gradually succeeded in gaining public attention about this epoch. Among the principal writers of this school are Von Hardenberg, better known as Novalis (1772–1801), a *pensée* writer of deep poetic insight; Ludwig Tieck (1773–1853), a writer of tales, dramas, and dramatic criticisms; La Motte Fouqué, Clemens Brentano, Hoffman, Musæus, Werner, Von Kleist, etc. The two Schlegels (August Wilhelm, 1767–1845, whose translation of Shakespere is still celebrated, and Friedrich, 1772–1829, best known by his philosophy of history) also belong to this school.

The war of liberation against Napoleon I introduced a strong, manly enthusiasm for a time into the hitherto gloomy and melancholy productions of the romanticists. Among the patriotic poets of the time, Ernst Moritz Arndt (1769–1860) and Theodor Körner (1791–1813) hold the first place. The ballads and metrical romances of Ludwig Uhland (1787–1872) have brought him a world-wide fame. Friedrich Rückert (1789–1866) also may be noticed as a lyric poet of merit. During the excitement produced by the July revolution in France (1830) a school of writers arose in whose works the social and political ideas of the time were strongly reflected. The most prominent names among this party are Ludwig Börne (1786–1838) and Heinrich Heine (1799–1856), whose writings combine the keenest satire and the finest pathos. Among the better known members of the school is Karl Gutzkow (1811–1878), a popular dramatist and novelist. As in England and France of late, the novel, especially the novel of a social or political character, has taken a prominent place in literature. Most distinguished are Freytag, Spielhagen, Heyse, Auerbach, Fanny Lewald, Hackländer, Reuter, Jensen, Storm, Rosegger, etc. Of late, however, science and learning rather than literature and the arts have produced the names of most eminence. Alexander von Humboldt (1769–1859) gave a great impulse to almost all branches of knowledge by his "Cosmos," his "Travels," and his "Views of Nature," and by the general suggestiveness of his labors. In history, Niebuhr and Mommsen, the historians of Rome; Leopold Ranke, the historian of the popes; Dahlmann, Gervinus, Sybel (French Revolution), Giesebrecht, Julian Schmidt, H. Kurz, and others may be mentioned. Biography has been well represented by Varnhagen von Ense, Pertz, David F. Strauss, and others. German modern theology and biblical criticism has had lately much influence in the religious world. Baur, Bleek, and Ewald are among the widely known names. Histories of art have been written by Kugler, Burckhardt, Lübke, and others. The brothers Grimm, Jakob (1785–1863), Wilhelm (1786–1859), were the founders of a new branch of philological and poetic investigation in ancient German literature. Eminent names in general philological science are those of Bopp, Pott, Schleicher, Steinthal, and Karl Brugmann. In natural sciences, Oken, Burmeister, Carus, Cotta, Liebig, Helmholtz, Virchow, Scheiden, Griesebach, Vogt, Bessel, Brehm, Häckel, Bastian, etc., are the eminent names; in philosophy, Schopenhauer, Feuerbach, Rosenkranz, Kuno Fischer, von Hartmann, Lotze, etc. Among recent poets, Anastasius Grün (pen name of Count von Auersperg) and Nikolas Lenau, among Austrians, and Meissner and Hattmann, natives of Bohemia, have a considerable reputation. Hervegh, Hoffmann von Fallersleben, Freiligrath, and Franz Dingelstedt infuse strong political sentiments into their poetry. Emmanuel Geibel, von Scheffel, Bodenstedt, and others represent a poetry more comprehensive in its aims and tendencies.

Germa'nia, common name used by the Romans for the vast regions extending between the Rhine and the Vistula, and from the Danube to the North Sea and the Baltic. They made their first real acquaintance with the inhabitants through Cæsar's campaign in Gaul. Drusus continued Cæsar's campaigns, extending the Roman conquests N. to the Elbe and E. to the Taunus Mountains, and Roman civilization began to make great strides in Germania, but on the defeat of Varus by Arminius, chief of the Cherusci, the whole N. portion of the Roman possessions from the Elbe to the Weser made itself independent. The Germanic tribes began to associate, and some of them, as the Marcommani and Quadi, of the second century, the Franks of the third, the Vandals of the fourth, and the Goths and Longobards of the fifth, were large nations. When the Germanic tribes, pressed by the Slavi and Huns, went westward and southward, the Romans were incapable of withstanding them. Tacitus noted that the Germans erected no temples and had no idols, but believed in a future life and in eternal justice; that they built no cities, and had no manufactures or trade, but held their women and households in deep respect.

German'icus Cæ'sar, 15 B.C.–19 A.D.; Roman military officer; son of Claudius Drusus Nero; commander in chief of the legions on the Rhine, 14, and gained great victories; recalled, 17, by Tiberius, who was afraid of his popularity, and sent against the Parthians and Armenians; died, probably poisoned, at Epidaphne, near Antioch. The most famous of his children were Caligula, the emperor, and Agrippina the younger, mother of Nero. Germanicus was also an orator and poet.

Germa'nium, a chemical element; discovered by C. Winkler, 1886, in the mineral argyrodite, which occurs near Freiberg, Germany; has since been found in small quantity in euxenite. Germanium is one of the elements the properties of which were foretold by Mendeléeff, 1870, and belongs to the same family as carbon and silicium, forming compounds resembling those of the elements named; atomic weight, 72.32; symbol, Ge.

Ger'man O'cean. See NORTH SEA.

German Sil'ver, or Nick'el Silver, alloy of variable constitution, designed as an imitation of silver. Eight parts of copper to three or four each of zinc and nickel make a fair imitation; and the addition of two or three per cent of iron renders it whiter, but less malleable. A very malleable sort has ten parts of copper, six of zinc, and four of nickel. The Chinese *pakfong* is essentially the same as German silver. As the price of nickel has increased, various cheaper white alloys have to some extent superseded German silver, which is, however, still extensively used. It is corroded by common acids such as vinegar, and melts at a red heat.

German Southwest' Af'rica, colony of Germany; extends along the Atlantic coast from the Cunene River to the Orange River, excepting Walfish Bay, which is under the British flag; adjoins Angola on the N., Cape Colony on the S., Bechuanaland and Rhodesia on the E., and its N. boundary is extended in a narrow strip to the Zambesi River; area, 322,450 sq. m.; pop. est. 200,000, of which abt. 5,000 are Europeans; chief towns, Windhoek (capital), Swakopmunde, Grootfontein, Gibeon. The needs of an enterprising Bremen trader named Lüderitz led to the acquisition, 1884, of this territory, which is about twice as large as Germany. Though half of it is within the tropical zone and the other half is subtropical, it is the only part of Africa, except Rhodesia, picked up by any European government since the scramble for colonies began that has attracted European immigrants. Most of the colonists are living in the mountainous region back of Walfish Bay, where there is good soil in the valleys. Little has yet been done to tap the sources of underground water, and the rainfall is insufficient to raise crops without irrigation except in Amboland, the N. district, which is still chiefly in possession of the natives. The whites as yet are found only around the springs, where they may get water for their fields. Potatoes and other European vegetables are raised, and also sugar cane, tobacco, and cotton. The natives belong to the Hottentot, Bushman, Bantu, and Damara races. Early in 1904 an uprising occurred among the Hereros, and by the end of 1905 Germany had sent 14,000 troops and spent about $50,000,000 to suppress it.

Ger'mantown, historical suburb, since 1854 the Twenty-second Ward of Philadelphia; noted for beautiful surroundings and elegant homes; settled, 1683–84, under a grant from William Penn by Dutch and German immigrants. Four of these sent to the Friends' Meeting, 1688, the first public protest made in America against the holding of slaves. The first paper mill was established here, 1690, and, 1743, the first American edition of the Bible was printed, in German. Here, too, is said to have been conducted the first Sunday school on record in the world. The town is the scene of an important battle of the Revolutionary War, in which the Americans, under Washington, after an all-night march, completely surprised the British forces under Howe, then in possession, and, at first successful, were afterwards seized with panic and routed with the heaviest losses of the war.

Ger'man Univer'sities. See UNIVERSITIES.

Germa'nus (French, ST. GERMAIN L'AUXERROIS), abt. 380–449; saint of the Roman Catholic Church; b. Auxerre; of a senatorial family, and distinguished for eloquence. He was made by the Emperor Honorius military governor of his native district, and, in 418, Bishop of Auxerre; twice visited England at the request of Celestine I, and suppressed Pelagianism there. His feast is celebrated July 31st.

Ger'many. See GERMAN EMPIRE.

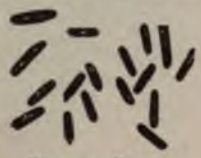
Germina'tion, in botany, the steps in the development of the embryo in the seed into the plant. It is naturally extended to the analogous development of any cryptogamous plant from its spore, which answers to seed. The embryo, originated in the ovule through its fertilization by a grain of pollen, completes its first stage of development in the seed while connected with the mother plant; when the seed matures it has a period of rest; after which, when placed in favorable circumstances, germination takes place. Seeds vary greatly as to the length of time during which they preserve their vitality. Many seeds, especially oily ones, soon lose the power of germination unless they are committed to the ground soon after their ripening, although when in the ground they sometimes remain quiescent for two or three years. Others, especially leguminous seeds, when kept dry, may retain the power of germination for several, or even for many, years. But the accounts of "mummy wheat," etc., growing after the lapse of two or three thousand years may be wholly discredited. The conditions favorable to germination are: congenial temperature, moisture, and darkness, or at least obscurity. Water is absorbed, and certain chemical changes ensue involving fermentation by which solid nourishing matter in the seed is liquefied and made available for growth. The mode of development of the embryo differs according to its conformation: usually the vesicle lengthens, projects in a vertical position, and develops a root. When

GERMINATION.

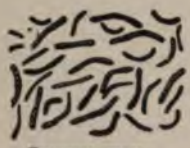
1. Section of seed of morning-glory, showing the embryo. 2. Same embryo detached and straightened. 3. Germination of the morning-glory. 4. Same, further developed.

the embryo has developed into a plantlet with root in the soil and foliage in the air and light, germination is complete. See SEEDS.

Germ The'ory of Disease', theory that certain forms of disease, and especially contagious and infectious diseases, are caused by the introduction into the living body of certain microorganisms and by their subsequent multiplication and products. As regards a number of specific diseases this has been demonstrated, while with regard to many others it is probable. Proof that a given disease is due to a particular microörganism depends on the following points: 1. The disease must be one which presents distinctive results, either in its symptoms and appearances during life or in its pathology observed after death. 2. It should be possible to find at some stage of the affection the microörganism in such numbers and distribution as to furnish a reasonable explanation of the symptoms. 3. It should be possible to distinguish these microörganisms from others by culture and other methods. 4. By means of a pure culture of this organism the specific disease can be produced in man or animals. 5. That the microörganism in question is never found in the body in health or in other diseases except as an accidental and nonpathogenic parasite. Such a chain of proof has been provided for anthrax, tuberculosis, erysipelas, tetanus, diphtheria, and many others. Most pathologists now agree with Koch that the invariable occurrence of a specifically identifiable parasite in a given disease, coupled with the fact that it is never found in any other disease, is sufficient to establish the causal connection. See BACTERIA.


TYPHOID FEVER.

DIPHTHERIA.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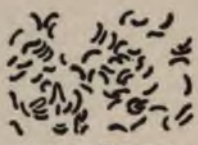
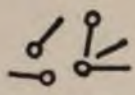

ASIATIC CHOLERA.

PNEUMONIA.


LOCK-JAW.

ERYSIPELAS.

Geronimo (jē-rŏn'ĭ-mō), native name GOYATHLAY, "one who yawns," 1829–1909; medicine man and prophet of the Chiricahua Apache Indians; b. No-doyohn Cañon, Ariz.; led frequent raids into Sonora, Mexico; surrendered to Gen. Crook in the Sierra Madre, 1882; terrorized the inhabitants of S. Arizona, New Mexico, and Sonora and Chihuahua, Mex., 1884–85; agreed to surrender early in 1886, but fled across the border; surrendered to Gen. Miles in August; entire band of 340 deported as prisoners of war to Florida; later settled at Fort Sill, Okla., under military supervision. Geronimo joined the Dutch Reformed Church; sought pardon that he might die a free man; and dictated "Geronimo's Story of His Life," published 1906.

Gérôme (zhā-rōm'), **Jean Léon,** 1824–1904; French painter; b. Vesoul; Prof. in the School of Fine Arts, Paris, 1863. His masterpiece in historical art, "The Age of Augustus and the Birth of Christ," was purchased by the government. Other noted paintings are: "Anacreon with Bacchus and Cupid," Toulouse Museum; "Russian Concert" and "Age of Augustus," Amiens Museum; "Abyssinian Chief," "Sheik at Devotions," Metropolitan Museum, New York; "Louis XIV and the Grand Condé," New York; "Duel after the Masquerade," "Cæsar Dead," Corcoran Gallery, Washington. The late A. T. Stewart paid 80,000 fr. for his "Gladiators."

Geropigia (jĕr-ō-pĭj'ĭ-ă) or **Jerupig'ia,** liquor exported from Portugal as brandy, and imported into the U. S. and Great Britain as wine; generally consists of grape juice, brandy, sugar, logwood extract, and other ingredients; is used in making imitations of wine and other liquors.

Ger'ry, Elbridge, 1744–1814; American statesman; b. Marblehead, Mass.; a successful merchant of his native town and a provincial legislator and patriot. He was specially interested in the naval operations of the Revolution, and was the founder of the Massachusetts Admiralty Court; in the Continental Congress, 1776–85; signed the Declaration of Independence; one of the framers of the U. S. Constitution, 1787, but refused to sign it. He was in Congress, 1789–93; was a special minister to France, 1797; Governor of Massachusetts (Anti-Federalist), 1810 and 1811, and defeated when running for that office, 1798, 1801, and 1812; Vice President of the U. S., 1812.

Gerry, Elbridge Thomas, 1837– ; American benefactor; b. New York; grandson of the preceding; was admitted to the bar, 1866, and elected member of the Constitutional Convention of 1867. He was associated with Henry Bergh, founder of the American Society for the Prevention of Cruelty to Animals, and was chiefly instrumental in securing most of the legislation affecting animals of the State of New York; was foremost in organization of the Society for the Prevention of Cruelty to Children, 1874; president of the society, 1876–1901; chairman of the commission whose report led to the system of electrical execution in New York State. He has held many offices of trust and honor, and is well known for his interest in yachting affairs.

Gerry, James Henry, 1828–1906; American inventor; b. Lowell, Mass.; early learned the

watchmaker's trade; invented the self-winding clock and the gravity escapement in clocks.

Gerryman'dering. See APPORTIONMENT.

Gerson (zhĕr-sōn'), **Jean Charlier de** (called also DOCTOR CHRISTIANISSIMUS), 1363–1429; French theologian; b. Gerson; studied theology under d'Ailly, from whose hands, 1392, he received the doctor's hat, having previously, while only a bachelor of divinity, been employed on missions to the rival popes, with a view to ending the great schism. In 1409 he went to the Council of Pisa, and, 1414, to that of Constance, in which he represented the Gallican Church, and in which he favored the superiority of the councils to the pope and the reforms of the Church within itself. He advocated the burning of Huss and Jerome of Prague. His opposition to the preaching friars (Dominicans) raised up so many enemies that he retired to Germany, where he lived until 1419, after which he went to the Celestine convent of Lyons and became a catechist of poor children. Many French and Benedictine authorities have claimed for him the authorship of "De Imitatione Christi," usually ascribed to Thomas à Kempis.

Gerson Ben Ju'dah, abt. 960–1030; French rabbi; b. Germany; introduced reforms among the European Jews, including the abolition of polygamy and repudiation, known as "institutions (*gezeroth*) of Rabbenu Gerson."

Gerstacker (gĕr'stĕk-ĕr), **Friedrich,** 1816–72; German traveler; b. Hamburg; sailed as a cabin boy to New York, 1837, and spent most of the remainder of his life in travel, visiting N., S., and Central America, the Pacific Islands, Australia, Java, Upper Egypt, Nubia, and Abyssinia. He published novels illustrative of the countries which he visited, and books of travel down to 1871. Several of his works have been translated into English.

Gervase (jĕr'vās) **of Can'terbury,** abt. 1141–1210; English chronicler; b. Kent; became a monk of Christ Church, Canterbury, 1163; began the composition of his valuable "Chronicle," 1188, and carried it down to 1210; wrote also a history of the Archbishops of Canterbury.

Gervase of Til'bury, d. abt. 1235; English historian; b. Tilbury, Essex; reputed nephew of Henry II; abt. 1208 made marshal of Arles; author of a remarkable "Otia Imperialia," a medley of history, curious learning, fables, and the natural sciences of that day; and perhaps author of a "History of Britain," which must not be confounded with the "Chronicle" of Gervase of Canterbury.

Gervinus (gĕr-vē'nōs), **Georg Gottfried,** 1805–71; German historian and politician; b. Darmstadt; 1835, professor extraordinary at Heidelberg; 1836–37, Prof. of History and Literature at Göttingen, but lost his place for political reasons; honorary professor at Heidelberg, 1844; works include a history of the nineteenth century, several volumes of Shakespearean criticism, and "History of German Poetry."

Geryon (jē'rĭ-ŏn), or **Gery'ones,** son of Chrysaor and Callirrhoe, a daughter of Oceanus; was a giant with three bodies, six feet, six hands, and three heads; king of the island of Erythea, on the coast of Spain, beyond the Pillars of Hercules (Straits of Gibraltar). The tenth labor of Hercules was to bring to Greece the beautiful herd of cattle that belonged to Geryon and were guarded by the powerful Eurytion and the two-headed dog, Orthus, the son of Echidna and Typho. Master, servant, and dog succumbed to the prowess of Hercules.

Gesenius (gē-sē'nĭ-ŭs), **Friedrich Heinrich Wilhelm,** 1786–1842; German Orientalist; b. Nordhausen; 1809, Prof. of Ancient Literature at Heiligenstadt; Prof. of Theology at Halle, 1810; gave a great impulse to Semitic learning by his philological works; founded a new school of biblical exegesis; published a "Hebrew and Chaldaic Lexicon," "Hebrew Grammar" translation of Isaiah, with critical commentary; "Origin of the Samaritan Pentateuch," etc.

Ges'ner, Johann Matthias, 1691–1761; German classical scholar; b. Roth; became rector of the Thomas Gymnasium in Leipzig, 1730, which dates its celebrity from this time; 1734, Prof. of Poetry and Eloquence in the newly founded Univ. of Göttingen; by reviving the study of Greek, and confining Greek and Latin instruction in the schools to classical authors, became the great reformer of the learned institutions throughout Germany.

Gesner, Konrad von, 1516–65; Swiss naturalist; b. Zurich; successively master of a school at Basel, teacher at Lausanne, and physician and professor at Zurich; most important work, "Historia Animalium (1551–56), a summary of all that was then known of zoölogy; also wrote on botany, philology, and bibliography.

Gesner, or **Gessner, Salomon,** 1730–88; Swiss author and artist; b. Zurich; author of "Daphnis," "Inkle und Yarico," "Idyls," and other poetical works; "Der Tod Abels," prose poem, beside dramas, tales, etc. His idyls were read with enthusiasm, and were among the most popular literary productions of the time. His etchings are for the most part very fine, and he had a good reputation as a landscape painter.

Gess'ler, Hermann, in Swiss legendary history, an imperial magistrate apppointed, 1300, joint governor of the forest cantons, Schwyz, Uri, and Unterwalden, by Albrecht I of Austria. By his bitter oppression he so enraged the Swiss that a conspiracy was formed against him, and he was shot, 1307, by William Tell (*q.v.*), peasant hero of Switzerland, who thereby initiated a general uprising of the cantons against the foreign tyranny.

Ges'ta Romano'rum (Latin, "the acts of the Romans"), one of the oldest mediæval collections of pious legends, designed for the edification of the monks and clerks; compiled probably by one Elinandus at a very uncertain date, and moral reflections were interpolated by Peter Berchorius (d. 1362), a Benedictine of

Poitou; was written in Latin, but translated into most of the vulgar tongues of Europe, and down to the revival of learning was extensively read. The work contains the germs of very many of the popular tales of modern literature.

Ge'ta. See CARACALLA.

Ge'tæ, people of antiquity, occupying in the time of Herodotus the territory between the Balkans and the Danube; later confused with the Dacians, a neighboring and related people. The old belief that the Getæ were of the same race as the Goths is not now generally received.

Gethsemane (gēth-sĕm'ā-nē), garden, or orchard, at the foot of the Mt. of Olives, where our Lord spent a part of the night preceding his crucifixion. The spot now shown by Latin monks is a short half mile from Jerusalem, nearly opposite the Golden Gate, just across the Kedron, at the angle made by the two paths that lead up over Olivet. The garden is nearly square, 160 ft. from N. to S., and 150 from E. to W., contains eight large olive trees, which are believed to be at least 1,200 or 1,300 years old, and has been inclosed by a high stone wall.

Get'tysburg, borough and capital of Adams Co., Pa.; 36 m. SW. of Harrisburg; is built on and surrounded by picturesque hills; contains several mineral springs of high medicinal value; is the seat of the Theological Seminary of the General Synod of the Evangelical Lutheran Church in the U. S., and of Pennsylvania College (Lutheran). The battle of Gettysburg occurred in and around the borough, July 1, 2, and 3, 1863. The National Cemetery here, dedicated by Pres. Lincoln, November 19, 1863, contains the graves of 3,580 Union soldiers, with a central monument. Since the close of the war numerous N. state, regimental, and individual monuments have been erected on the various historic points on the battlefield. The Confederate dead have nearly all been exhumed from the battlefield and taken to S. cemeteries.

Gettysburg, Bat'tle of, decisive battle of the Civil War in the U. S., fought July 1, 2, and 3, 1863, between the Union Army of the Potomac, under Gen. George G. Meade, and the Confederate Army of N. Virginia, under Gen. Robert E. Lee. Having resolved on an invasion of the North, the Confederates had early in June concentrated a force of nearly 100,000 men, including 15,000 cavalry, in the vicinity of Culpeper, Va. They moved down the valley of the Shenandoah, and on the 24th and 25th crossed the Potomac in two columns, which, uniting at Hagerstown, Md., pressed on toward Chambersburg, Pa. The Union army, having broken up its camp opposite Fredericksburg and moved N., crossed the river lower down on the 28th, on which day Hooker, having resigned, was succeeded by Meade. Lee's communications being threatened, he resolved to concentrate his whole force at Gettysburg, already (unknown to him) occupied by a part of the Union army under Reynolds. The first collision occurred on July 1st, about 2 m. NW. of Gettysburg, between the Confederate advance under A. P. Hill and a reconnoitering party of cavalry (afterwards supported by infantry) sent out by Reynolds. The Union forces, at first superior, were soon outnumbered, and were driven back in confusion through Gettysburg, losing about 5,000 prisoners and as many killed and wounded. The Confederate loss in killed and wounded was probably somewhat greater, in prisoners much less.

Both sides hurried their forces, and on the morning of the 2d the bulk of the two armies was in position, the Union on Cemetery Ridge S. of Gettysburg, and the Confederate on Seminary Ridge opposite (to the W.), except Ewell's corps, which lay 2 m. distant at the foot of Culp's Hill on the Union right. The forces present or close at hand were about

equal, each numbering from 70,000 to 80,000 infantry and artillery. Lee resolved to attack the Union position. The main attack was made by Longstreet's corps on the Union left, where considerable ground was gained. On the right Ewell effected a lodgment within the Union intrenchments. The Union loss in this action was fully 10,000, half in Sickles's corps, which lost nearly half its numbers. Lee determined to continue the assault on the 3d. Early in the morning Meade took the offensive against Ewell, and forced him from the foothold which he had gained, but of this Lee was not informed. The Confederates spent the morning in preparation, and at one o'clock opened fire from 120 guns, which was immediately returned, though Meade, owing to the rugged nature of the ground, was able to use at once only 80 of his 200 guns. After two hours the Union fire was gradually suspended, and Lee, supposing that their batteries had been silenced and that the infantry must be demoralized, ordered the grand attack of the day, which was directed against the Union center.

The attacking column numbered about 18,000, consisting of Pickett's division and Pettigrew's brigade. Though met by a terrible fire of artillery and musketry, it pressed on, Petti-

grew reaching within 300 yds. of Hancock's line, when he was driven back in disorder; while Pickett's division charged through Gibbon's front line among the Union batteries, where for a quarter of an hour there was a struggle with pistols and clubbed muskets. The Union troops hurried from all sides and drove the enemy back down the slope, not one in four escaping. Meade with his right then drove back Hood from the ridge he had won the preceding day. The Confederate loss this day was about 16,000 in killed, wounded, and prisoners; the Union loss was about 3,000. Both armies remained inactive the next day, and during the night Lee began his retreat to the Potomac, which he reached on the 7th. Here he was compelled to halt by the swollen stream. On the 12th Meade came in front of the Confederate intrenchments but an attack was postponed till the 14th, when Lee was found to be safe on the other side, having succeeded in crossing during the night. The Union loss at Gettysburg was 23,190, of whom 2,834 were killed, 13,713 wounded, and 6,643 missing. The Confederate loss has never been officially stated; but by the best estimates it was about 36,000, of whom about 5,000 were killed, 23,000 wounded, and 8,000 unwounded prisoners. The entire number of prisoners was about 14,000.

Geyser (gī'sêr), eruptive hot spring from which water is projected, at more or less regular intervals, as from a fountain. Geysers,

Great Geyser, Iceland.

hot springs, and mud springs are associated in districts of comparatively recent volcanic activity. The water is received by infiltration from the surface, and the heat is believed to be derived from buried lava flows, not yet entirely cooled. Geysers are produced when a column of water accumulates in a nearly ver-

Third Geyser.

tical passage of considerable depth so that it may be heated at the bottom to temperatures above the ordinary boiling point. When the temperature reaches such a degree that the

The Giantess.

water boils in spite of the pressure of the superincumbent column steam is formed rapidly and the greater part of the water is violently discharged. The geysers of Iceland have been known for seven centuries and until the nineteenth century were believed to be unique,

but those of the Yellowstone National Park are much more numerous than those of any other field in the world, over seventy being enumerated.

Ghat, or **Ghaut** (gât), in India, (1) a pass through a mountain range; (2) a landing place or stairway for people to use in going on or off boats in the rivers. These ghats are used also as bathing houses and as places of rest and recreation.

Ghats, or **Ghauts,** two chains of mountains in the peninsula of Hindustan, running respectively along the E. and W. coasts, joining each other in Cape Comorin, and inclosing on the two sides the table-land of the Deccan. The W. Ghats form a distinct range, though interrupted by the gap of Palghatcheri, of a height varying between 4,000 and 7,000 ft. Their gold mines have long been worked, but, 1874, gold-bearing strata of extraordinary richness were discovered. The W. side of these mountains is very steep, but toward the interior they slope in gentle undulations. The E. Ghats are lower, their average height being only 1,500 ft.; they are often interrupted, and almost disappear ere reaching Cape Comorin.

Ghawazi (gä-wä'zē), degraded class of public dancers in Egypt who amuse the populace. They are of both sexes, and must be distinguished from the more respectable Egyptian singing girls called almehs.

Ghaznevides (gäz'nē-vīdz), a famous dynasty of Afghan monarchs who reigned at Ghazni and at Lahore from 961 A.D. to 1184. At the time of the Sultan Mahmoud (d. 1030) the empire had its widest extent, occupying a great part of Persia, W. Tartary, a part of India, and the intermediate countries. These sultans were zealous orthodox Mohammedans.

Ghazni (gäs'nē), walled city of Afghanistan, the seat of two mediæval dynasties, on the central table-land; 7,726 ft. above the sea, on the direct road from Kandahar to Kabul. Its history begins with the tenth century, when it was the capital of the Ghiznevid Empire. After falling successively into the hands of the Sultan of Ghûr and of the Mongols, it was in the eighteenth century incorporated in the kingdom of Afghanistan. There are many ruins and shrines in the vicinity, including the tomb of Mahmud and the minaret of Mahmud. The Gates of Somnath, which formerly belonged to the tomb of Mahmud, were carried off by Lord Ellenborough, 1842, and are at Agra; according to prophecy, the downfall of the Sikh dominion turned on their removal. Pop. abt. 10,000.

Ghee (gē), kind of butter used in many parts of India, prepared generally from the milk of buffaloes. It is boiled, cooled, and churned after curdling, and has a strong smell and flavor.

Gheel (gēl), town of Belgium; province of Antwerp; 26 m. S. of Antwerp city. Since the seventh century this town and its surroundings have been inhabited by a great number of idiots and lunatics, who at first sought a cure here from the shrine of St. Dymphnea, and later from the peculiar and often advantageous treatment they underwent in the houses of the citizens and farmers. The establishment is now under government control.

Ghent (gēnt), or French, **Gand** (gäñ), city of Belgium, capital of the province of E. Flanders; situated at the confluence of the Scheldt and the Lys, and divided by numerous canals and branches of the rivers into islands, connected with each other by about 300 bridges. The general character of the city is that of a town of the Middle Ages which has largely become modern; dark and narrow streets, with singular houses towering like castles, alternate with open and beautiful quays lined with elegant edifices. Among notable buildings are the city hall; the Belfry, a square tower 375 ft. high, surmounted by a large golden dragon and containing the famous chime of bells; the cathedral, containing masterpieces by Jan and Hubert van Eyck; the Vrydag market, where Jacob van Artevelde instituted civil war and the executions under the Duke of Alva took place; the famous university, with its large and priceless library; the Church of St. Michael (fifteenth century), containing the celebrated "Crucifixion" by Vandyke, and the Begynehof, a large nunnery with eighteen convents, a church, and a population of abt. 700 Beguines.

Ghent has numerous scientific and benevolent institutions. Its manufactures are not so prominent as they formerly were, yet its spinning, weaving, and cotton printing, and its manufactures of lace, leather, sugar, and machinery are considerable. Its commerce is extensive, and its harbor and shipping facilities excellent. Historically, Ghent is famous. In 949 the Emperor Otto the Great built a castle to defend the city against the counts of Flanders; nevertheless, in 1000 the counts seized the city. In the fourteenth century Ghent, under Jacob van Artevelde, waged violent wars against Louis of Flanders and the dukes of Burgundy; in the fifteenth century it fought obstinately against Charles the Bold, but under the Emperor Charles V its splendor began to wane; it was conquered by the emperor in 1540, and heavily taxed. When his sister Maria, regent of the Netherlands, demanded a subsidy of 1,200,000 gold florins from Flanders, and the citizens refused to pay, the emperor carried through his will without mercy. In 1576 the *Pacification de Gand* was concluded in Ghent, a confederation between Holland, Zealand, and the provinces of the Netherlands against Spain. It was conquered, 1584, by the Duke of Parma, and, 1678, by Louis XIV of France, who, however, restored it to Spain. In 1713 it fell to Austria. Several times it was taken by the French, but by the Peace of Paris, 1814, it was incorporated into the Netherlands; on the establishment of Belgium, 1830, it became a Belgian possession. Pop. (1900) 162,249.

Ghent, Trea'ty of, treaty between the U. S. and Great Britain, negotiated on the part of the U. S. by John Q. Adams, Henry Clay, Albert Gallatin, and two other envoys at Ghent;

concluded December 24, 1814, and ratified February 17, 1815. It put an end to the War of 1812. The leading provisions were: (1) Restoration of all territory, places, and possessions taken by either party from the other during the war, except the islands mentioned in Article IV. Public and private property, including slaves, remaining in such places at the time of ratifying the treaty were not to be destroyed or carried away (Art. I). (2) Article IV provides the appointment of a commission to decide to which of the two powers certain islands in and near Passamaquoddy Bay belong; if the commission should fail to come to a decision, the subject to be referred to some friendly sovereign or state. (3) Articles V-VIII provide for several commissions to settle the line of boundary as described in the treaty of 1783—one to settle the line from the St. Croix River to where the 45th parallel cuts the St. Lawrence River (the Iroquois or Cataraqua in the treaty); another to determine the middle of the water communications from that point to Lake Superior; and a third to adjust the limits from the "water communication between lakes Huron and Superior to the most NW. point of the Lake of the Woods." If any of these commissions should not make a decision, the subject was to be referred to a friendly sovereign or state, as before. (4) Article IX binds both parties to use their best endeavors to abolish the slave trade, as being "irreconcilable with the principles of humanity and justice." The treaty of Ghent is remarkable for omitting to provide for some important interests, as the impressment of seamen, one of the main causes of the war, together with certain questions of maritime rights concerning preëmption and paper blockades and the claims of the U. S. still to participate in the fisheries according to the provisions of the treaty of 1783: and no conclusion was reached touching the naval forces to be maintained conjointly on the N. lakes, which were common to both parties.

Gherardesca (gä-rär-dĕs'kä), noble family of Pisa, prominent in Ghibelline Party; most noted member, Ugolino della Gherardesca, who conspired against his former party with Giovanni Visconti, the chieftain of the Guelphs; betrayed the Pisans; made himself master of the region, and ruled so despotically for four years that Archbishop Ubaldini headed a general rising against him. Ugolino was forced to surrender, and, with his two sons and three grandsons, was imprisoned in the Gualaudi Tower and left to die of starvation. The sufferings of the prisoners and the story of Ugolino form the subject of one of the most pathetic passages in Dante's "Inferno." In spite of the fate of Ugolino, the family continued to be prominent in Pisan affairs for many years, and, 1329, again held the chief power in the person of Nieri Donoratico Gherardesca.

Gherkin (gĕr'kĭn), small cucumber or cucumberlike fruit used for pickling; common form is simply a small and immature cucumber; several varieties of cucumber are grown for gherkins.

Ghetto (gät'tō), quarter in Italian cities, to which the Jews were formerly confined. The noted ghetto of Rome, instituted, 1556, by Pope Paul IV, was removed, 1885, to make room for the new Tiber embankment. The term is also employed to indicate the Jews' quarters in any city.

Ghibelline (gĭb'ĕl-lĭn). See GUELPH.

Ghiberti (gē-bĕr'tē), **Lorenzo**, 1378–1455; Florentine sculptor; b. Pelago; designed and executed the two sets of bronze folding doors in the baptistery of San Giovanni in Florence, which cost him forty years of labor. His other works in bronze include the reliquary of St. Zenobius and a St. Matthew. These and the second door of San Giovanni are the masterpieces of modeling in the fifteenth century. Ghiberti was noted also as an architect, and excelled in painting on glass and in the goldsmith's art. He wrote treatises on sculpture and Italian art.

Ghika (gē'kä), name of a princely family of the Danubian principalities, over which several Ghikas ruled as hospodars, and in which many of them held very high state offices. In 1657 GEORGE GHIKA was first appointed by Turkey hospodar of the principalities, and after him eight other members of that family held the same princely office in Moldavia or in Wallachia. Since the beginning of the nineteenth century ALEXANDER, CONSTANTIN, DEMETRIUS, and JOHN have been the most celebrated and the most active members of the Ghika family. They took part in all the conspiracies and political measures which finally brought about the fusion of the two principalities of Moldavia and Wallachia into a single state, now called Roumania.

Ghirlandaio (gĕr-län-dä'yō), otherwise called CORRADI, or BIGORDI, DOMENICA DEL, 1451–95; Florentine painter; assisted in the decoration of the Sistine chapel in Rome, and executed a series of frescoes in the Sassetti chapel in Santissima Trinità, Florence; also painted many easel pictures in oil and distemper; but his frescoes are his finest works; is said to have created the representation of aërial perspective, and to have perfected the art of mosaic. He was the master of Michelangelo.

Ghizeh, or Gizeh (gē'zē), town in Egypt; on the left bank of the Nile, just above Cairo; formerly a splendid town, now mostly in ruins. The principal pyramids are in its immediate neighborhood. Pop. abt. 11,000.

Ghizni (gēz'nē). See GHAZNI.

Ghost, spirit of a human being, or, in a more popular sense, an apparition, or a departed human spirit made visible. Belief in the occasional appearance of ghosts exists in all countries, and has existed in all ages. The belief in ghosts probably arose from the phenomena of dreams in which the "spirit" of the dreamer seemed able to visit distant places while his body was unconscious in sleep. This led to many religious theories, such as ancestor worship, a future state, witchcraft, etc. Many ceremonies developed from the primitive

attempts to placate these departed spirits and ward off the evil influence some of them were supposed to possess. Among the more recent developments of this belief are the newer phases of the so-called spirit manifestations, studied by Sir William Crooke and his coadjutors. Artificial ghosts, such as are seen on the stage, are made by glass plates which reflect only a faint outline of the person who personates the ghost. By equally simple means the ghost may be magnified, distorted, decapitated, etc., in many surprising ways.

Ghost Dance, ceremonial of an American Indian religious movement, commonly known as the Messiah Religion. The belief in a redeemer who was to come to restore his people to their original happy condition was common to all the nations of antiquity, and was general among the Indian tribes of N. America. More especially since they have felt the pressure of white civilization, and seen themselves deprived of their lands and cut off from their former mode of living, have prophets arisen among the tribes, who have preached the speedy return of the Indian life and a future happy existence in the old Indian manner, secure from disturbance by the whites. The Sioux outbreak in the winter of 1890–91 was indirectly connected with the ghost dance, but the disturbance was only local, while the ghost dance is general.

Ghost Moth, European moth (*Hepialus humuli*) of the *Bombycidæ*, whose destructive larvæ, known as *otters*, bore into hop vines and the stalks and roots of many plants. The moths are white below and brown above; and hence, as the upper surface is turned toward or away from the spectator in flight, the moth appears and disappears by turns.

Ghur (gōr), or **Ghore** (gōr), mountainous district of W. Afghanistan, SE. of Herat and NW. of Kandahar; inhabited by Hazaras and Eimaks; since 1845 included in the territory of Herat.

Ghuri (gō'rē), descendants of an ancient race of Afghan princes, and the second line of Mohammedan rulers in Hindustan. Allah-ad-deen (d. 1160) and his successors conquered the whole country from the Caspian to the Bay of Bengal; but their power was short-lived. The period of their authority is usually given as from 1176 to 1206, after which their power was feeble and hardly more than nominal.

Ghurkas, or Ghoorkas (gōr'käs), native race in Nepal; of Hindu descent; speak a dialect derived from the Sanskrit; are largely employed as soldiers in the Anglo-Indian army and are among its best troops.

Ghuzni (gūz'nē). See GHAZNI.

Giacometti (jä-kō-mēt'tē), **Paolo,** 1816–82; Italian dramatist; b. Novi Ligure; wrote the drama "Rosilda" when twenty years old; later the tragedies "Queen Elizabeth of England," "Torquato Tasso," "Lucrezia Davidson," and "Sophocles," his masterpiece; also the comedy "The Woman with a Second Husband."

Giacome'no da Vero'na, Italian poet of the thirteenth century; anticipated Dante's "Divine Comedy" with two striking works in the Veronese dialect: "The Celestial Jerusalem" and "The Infernal City of Babylon."

Gianibelli (jä-nē-bēl'lē), or **Giambelli** (jäm-bēl'lē), **Federigo,** b. abt. 1530; Italian military engineer; b. Mantua; offered his services to Philip II of Spain, but finding slight appreciation at the Spanish court, went to the Netherlands, where he gave valuable aid in the defense of Antwerp, 1585, destroying by explosives the bridge across the Scheldt, built by the Duke of Parma, and causing great carnage among the Spaniards. At the time of the Armada he entered the service of Elizabeth, to whom he rendered effectual aid by directing the fortification of the coast, and by fitting out fire ships which were sent into the lines of the Spanish fleet. The date of his death, which is thought to have occurred in London, is unknown.

Giannone (jän-nō'nā), **Pietro,** 1676–1748; Italian historian; b. Ischitella; published a "Civil History of the Kingdom of Naples," 1723, for which for its sharp criticism of the holy see he was excommunicated and forced to leave Naples; took refuge in Vienna, where he received a pension from the emperor Charles VI; but, 1734, he was deprived of this, and again driven into exile. After a similar experience at Venice, where he incurred the suspicions of the government, he lived at Geneva, but a fresh attack on the papal policy in his "Il Triregno," etc., again exasperated the Church authorities. He was decoyed across the border of Savoy and thrown into prison at Turin, where he died.

Gi'ant, human being of extraordinary size and strength. The term is primarily a mythological one. The Greek giants were huge earth-born beings, who, according to the older writers, had the form of men (later writers made them hideous monsters), and who revolted against the gods, who finally slew them. The Norse myths give the giants (jotuns, frost giants, etc.) a prominent place. The giants are held by some to represent the adverse forces of nature; by others, human enemies of foreign race. Thus, English folklore abounds in traditions and nursery tales of Cornish and Welsh giants, and Cæsar speaks of the huge stature of the ancient Germans and Gauls; but in authentic history there are accounts of races of men of very large size. The Hebrew Scriptures allude to giants (nephilim) before the flood, and in and about Palestine there were, in Joshua's time, the Rephaim, Anakim, Emim, and Zamzummim, all men of great stature. The names of Og, two Goliaths, Ishbibenob, and Saph are preserved to us. In recent times there was a belief that the Patagonians and the men of Guayaquil were giants; and it is unquestionable that the former do exceed in stature the average of mankind. Scores of authenticated instances are recorded of persons exceeding 7½ ft. in height. Several are on record of men measuring 9 or even 9½ ft., but these are open to some question. Very tall persons, it is observed, are much less numerous

than those who are undersized. As a rule, "giants" are comparatively feeble in body and mind, and nearly all are short lived. There is on record an account of Bishop Berkeley's attempt to produce a giant. We are told that he fed an orphan named Magrath on selected articles of food, and that when he died, aged twenty, Magrath's height was 7 ft. 8 in. But a more direct cause of excessive growth than a diet of selected foods is found in the pituitary gland, a rudimentary organ at the base of the brain, which seems to be the growth center of the body, or at least the proportion regulator of the skeleton. In many giants and "strong men" this gland is found to be diseased or overgrown.

Giant Pow'der. See EXPLOSIVES.

Giant's Cause'way, promontory of columnar basalt on the N. coast of Ireland. The cliffs consist of thick sheets of basalt, with intervening beds of ocherous clay. The lower layers of basalt are rich in zeolitic and other minerals, and in certain beds the columnar structure is very strongly developed, and in places these are beautifully exposed. The causeway itself consists of columnar basalt that has been laid bare by the waves, but has itself resisted their action; and here the visitor can make his way for a long distance over an irregular floor formed of perfectly developed polygonal columns, which illustrate the peculiarities of this kind of rock formation.

THE GIANT'S CAUSEWAY.

Giaour (jowr), term applied by Turks and other Mohammedans to Christians and others not of their own faith. Its use is not always intended as a reproach, but very commonly has that character. It resembles the *gentile* of Jewish designation, which likewise may be used in a perfectly innocent sense.

Gibbes (gĭbz), **Robert Wilson,** 1809–66; American scientist; b. Columbia, S. C.; distinguished as a paleontologist, ornithologist, ichthyologist, and antiquary, as well as a physician; published "Monograph of the Squalidæ," "Typhoid Pneumonia," "Documentary History of S. Carolina," "Memoir on Mososaurus," "Cuba for Invalids," and many scientific papers.

Gibbites (gĭb-ĭtz'), sect which arose in Scotland in the last part of the seventeenth century, and was led by a sailor, John Gibb, whence the nickname. They combined some of the doctrines of the Quakers with others of the strict Covenanters, and were never numerous. Imprisonment of the Gibbites broke up the movement, and they were soon extinct as a separate body.

Gib'bon, Edward, 1737–94; English historian; b. Putney. In 1753 declared himself a Roman Catholic; was placed under the instruction of a minister of Lausanne, 1753–58, under whose training he renounced Catholicism (1754); acquired a vast knowledge of history and of Latin and French literature. He returned to England, and pursued the reading of Greek authors with zeal; entered Parliament, 1774; was a constant Tory, and, 1778, became a member of the board of trade; resided at Lausanne, 1783–93, chiefly occupied with the completion of his "History of the Decline and Fall of the Roman Empire," the production of which was first thought of at Rome, 1764, the first volume appearing 1776 and the last 1778.

Gibbon, John, 1827–96; U. S. army officer; b. near Holmesburg, Pa.; graduated at West Point, 1847; served in the war with Mexico, 1846–47, and with distinction in the Civil War, in the second battle of Bull Run, at S. Mountain, Antietam, Fredericksburg, Chancellorsville, Gettysburg, and various battles in Grant's Richmond campaign; commanded the Twenty-fourth Corps, and was engaged about Petersburg against the army of Gen. Lee up to the

surrender of the latter, 1865. For his services he received the successive brevets from major to major general; retired, 1891; published "The Artillerist's Manual," and contributed to various magazines.

Gibbon, tailless monkeys of the E. Indies; constitute with the gorillas, chimpanzees, and orangs, the group called anthropomorphous

GIBBON.

apes; are rather small, very long armed, of gentle disposition. They live among the branches of trees, and leap from branch to branch with freedom.

Gib'bons, Abigail (HOPPER), 1801–93; American philanthropist; b. Philadelphia; daughter of Isaac Tatem and Sarah Hopper; married, 1833, to James Sloan Gibbons, of Wilmington, Del., who removed to New York in 1836. In 1845 Mrs. Gibbons was an efficient coworker with her father in the formation of the Women's Prison Association, and in founding the home for discharged prisoners, since known as the Isaac T. Hopper Home. In 1861 visited the army hospitals at Washington, and throughout the Civil War rendered services in hospital and camp. The antislavery sympathies of her husband and herself were well known, and in the New York riots of 1863 their house was one of the first to be sacked. In 1871 she was interested in the establishment of the New York Infant Asylum; 1873, took part in opening the New York Diet Kitchen, and president of the association which supports it.

Gibbons, Grinling, 1648–1721; English woodcarver; b. Rotterdam; went to London after the great fire of 1666, and was taken into the employment of Charles II, and afterwards of George I. Several of the princely houses of England—Chatsworth, Petworth, and Burghley—contain specimens of his exquisite work in screens, sideboards, chimney pieces, ornamental panels with flowers, fruit, birds, carved with a precision and delicacy that entitle them to the rank of works of very fine art.

Gibbons, James, 1834– ; American cardinal; b. Baltimore, Md.; pastor of St. Bridget's Church in Baltimore, 1861; consecrated Vicar Apostolic of N. Carolina, 1868; Bishop of Richmond, Va., 1872, and, 1877, Archbishop of Baltimore, which see, being the oldest in the U. S., is looked on as the chief or primatial among Roman Catholic dioceses; cardinal, 1886; author of contributions to secular and religious reviews, and "The Faith of our Fathers: Our Christian Heritage," and "The Ambassador of Christ."

Gibel (gib'ĕl), or **Prus'sian Carp,** small European fresh-water fish, the *Cyprinus gibelio*; is prized for the table, but is not easy to catch, as it seldom takes the hook.

Gib'eon (Hebrew, meaning "built on a hill"), town of Palestine; one of the four cities of the Hivites, 5 m. NW. of Jerusalem; mentioned in Josh. ix, 3 as obtaining by craft exemption from the destruction which overtook their neighbors. It was within the territory of Benjamin, and one of the cities given by lot to the Levites. Here in later times was the Tabernacle. Solomon paid it a visit at the beginning of his reign, and there prayed for an "understanding heart" (1 Kings iii, 4, 5).

Gibraltar (jĭ-brăl'tăr), extreme S. promontory of Spain; an insulated rock connected with the mainland only by a low, sandy slip of land between the Bay of Gibraltar on the W. and the Mediterranean on the E.; area, 1¾ m. This rock, together with that of Abyla, now Ceuta, on the African coast, formed the so-called Pillars of Hercules, which by the ancients were considered the W. boundary of the earth. The Rock of Gibraltar is 1,439 ft. high at point of greatest elevation, almost perpendicular on its S. and E. sides, and sloping and accessible only on its N. and W. sides. It is a mass of limestone, and, like most limestone formations, is honeycombed by caves and caverns, some of which, besides their fantastic form, have an additional interest on account of the palæontological and archæological remains which they contain. Vessels aggregating 5,000,000 tons burden yearly enter the port; about three fourths of them are British. In 1704 Gibraltar was taken by the British, and they have retained it since as the key to the Mediterranean, and have fortified it, especially on its W. and N. sides, so as to make it impregnable. The Rock of Gibraltar is a crown colony, and the governor, who is also commander in chief, exercises all the functions of government and legislation. On the NW. slope is the town of Gibraltar. Pop. (1901), civil, 20,355; military, 6,475; settled population mostly descendants of the Genoese settlers. (See illustration on opposite page.)

Gibraltar, Strait of, channel connecting the Atlantic with the Mediterranean; 15 m. wide and 900 fathoms deep; separates Spain from Africa, and extends from Cape Spartel to Cape Ceuta on the African coast, and from Cape Trafalgar to Europa Point on the Spanish coast.

Gib'son, John, 1791–1866; Welsh sculptor; b. Gyffyn; successively apprenticed to a cab-

inet maker and a wood carver; enabled to study in Rome under Canova and after his death with Thorwaldsen; passed most of his life in Rome; first of modern sculptors to color his statues; works principally portrait statues and ideal pieces founded on classic models; best known are statues of Queen Victoria in Buckingham Palace, at Osborne, and at Westminster.

Gid'dings, Joshua Reed, 1795–1864; American statesman; b. Athens, Pa.; removed to Ashtabula Co., Ohio; enlisted as a soldier, 1812; admitted to the bar, 1820; elected to the state legislature, 1826, and to Congress, 1838, where he was a prominent antislavery champion. In 1842 he introduced resolutions justifying the slaves on the *Creole*, who had captured that vessel on her passage from Virginia to New Orleans, and carried her into Nassau, where their right to freedom was recognized by the British authorities. The great excitement caused by his resolutions induced him to withdraw them, but he was censured by Congress, and resigned; reëlected, and continued in Congress till 1859, persistently advocating his antislavery views. He acted generally with the Whigs till 1848, when he joined the Free-soil Party. In 1850 opposed the enactment of the "compromise measures," especially the fugitive slave law. From 1861 till his death he was consul general for the British N. American provinces. A volume of his speeches was published, 1853; also wrote "The Exiles of Florida" and "The Rebellion, its Authors and Causes."

Gid'eon, surnamed JERUBBAAL, fifth judge in Israel; son of Joash, of the tribe of Manasseh; dwelt at Ophrah; delivered Israel from the Midianites and Amalekites, and his countrymen solicited him to become their king, but he declined, and for forty years held the office of judge.

Giers (gērs), **Nicholas Carlovitch de.** See DE GIERS.

Gifford, Sanford Robinson, 1823–80; American landscape painter; b. Greenfield, N. Y.; National Academician, 1854; traveled in Europe, 1855–57 and 1868–69. His work was highly esteemed in his time; includes "Ruins of the Parthenon," in the Corcoran Gallery, Washington; "Sunrise on the Matterhorn," "Lake Geneva," "San Giorgio, Venice," "Lake Scene on the Catskills."

GIBRALTAR.

Gifford, William, 1757–1826; English author; b. Ashburton, Devon; apprenticed to a shoemaker, but friends purchased his freedom and sent him to Oxford. In 1794 published "Baviad," a paraphrase on the first satire of Persius; 1795, the "Mæviad," an imitation of Horace; and, 1800, his "Epistle to Peter Pindar"; translated Juvenal and Persius, and edited the dramatic works of Massinger, Ben Jonson, Ford, and Shirley. He was editor of the *Quarterly Review*, 1809–24.

Giga (jē'ga), or **Gigue** (jīg), short piece of music popular in olden times; of a lively character; in 6-8 or 12-8 time, sometimes in 3-8; used formerly as a dance tune. Jig is a form of the same word.

Gignoux (zhēn-yō'), **François Régis,** 1816–82; French painter; b. Lyons; taught by Delaroche, Vernet, and others; 1840, settled in New York and devoted himself to landscape painting; best works, "The Dismal Swamp in Autumn," "Niagara in Winter," "Bernese Alps by Sunrise," "The First Snow," "The Indian Summer"; after 1870 lived in France.

Gigoux (zhē-gō'), **Jean François,** 1806–94; French figure and portrait painter; b. Besançon; became famous, 1835, by his "Death of Leonardo da Vinci"; later exhibited "The Dead Christ," "The Death of Cleopatra," and "Galatea."

Gijon (hē-hōn′), fortified seaport of Asturias, Spain; on the Bay of Biscay; 15 m. NNE. of Oviedo; has active fisheries and some coasting trade; harbor safe, though not easily accessible. In 1810 the town was sacked and its shipping destroyed by the French. Pop. (1900) 47,544.

Gila (hē′lä), river of the U. S.; rises in Socorro Co., N. M., and flows first SW., then S., and finally W., joining the Colorado about 180 m. from its mouth; course is entirely within the territories of New Mexico and Arizona; length not far from 500 m.; half of its course is through mountain cañóns, but its lower half flows through a series of desert plains; waters and those of its tributaries are utilized for irrigation. Its lower valley abounds in ruins, relics of ancient culture now represented by the Pima and Maricopa Indians, and a few other tribes.

Gila Mon′ster, popular name in the SW. U. S. for a peculiar lizard. See HELODERMA.

Gil′bert, Mrs. George H. (HARTLEY), 1821–1904; American actress; b. Rochdale, England; began her stage career as a dancer in London; married Mr. Gilbert, also a dancer, 1846; visited the U. S. and settled here, 1849; active on the stage till a day or two before her death, making her last appearance at eighty-three, at Chicago, in "Granny," a play written for her by Clyde Fitch.

Gilbert, Sir Humphrey, 1539–83; English navigator; half brother of Sir Walter Raleigh; b. Dartmouth; knighted, 1570, for military services in Ireland; 1576, published "A Discourse of a Discovery for a New Passage to Cathay," to prove the possibility of a NW. passage; 1853, sailed with five vessels and 260 men, and founded a colony in Newfoundland; lost at sea in a gale after sailing for England.

Gilbert, Sir John, 1817–97; English painter; b. Blackheath, Kent; 1839, first exhibited in the British institution, where he was represented almost every year afterwards; 1852, elected an associate; 1853, a member, and, 1871 (when he was knighted), president of the Society of Painters in Water Colors; best known paintings, "Don Quixote giving Advice to Sancho Panza," and other subjects from Cervantes; "The Education of Gil Blas," "The Murder of Thomas à Becket," "Charge of Cavaliers at Naseby," "Entry of Joan of Arc into Orleans," and "Morning of Agincourt." He also illustrated the works of Shakespeare, Longfellow, Scott, and others, and contributed for years to *The Illustrated London News*.

Gilbert, or **Gil′berd, William,** 1540–1603; English scientist; b. Colchester; first physician to James I, 1603; author of "The Magnet, Magnetic Bodies, and the Great Magnet of Tellur" and "The New Sublunar Philosophy of Our Earth," works of surprising accuracy of statement and profound thought; was far in advance of his time as a scientific observer and theorist, and as a recorder of facts.

Gilbert, William Schwenck, 1836– ; English dramatist; b. London; called to the bar of the Inner Temple, 1864, but later devoted himself to literature, and famous as a dramatic writer; knighted, 1907. His fairy comedies, "The Palace of Truth," "Pygmalion and Galatea," "The Wicked World," "Broken Hearts," etc., and his farces, "Engaged," "Ne'er-do-Weel," etc., were very popular; and a still greater measure of success was achieved by his comic operas, written in conjunction with Sir Arthur Sullivan: "The Sorcerer," "H. M. S. Pinafore," "The Pirates of Penzance," "Patience," "Iolanthe," "Princess Ida," "The Mikado," "Ruddigore," "The Yeoman of the Guard," "The Gondoliers," "Utopia (Limited)," "His Excellency," "The Grand Duke," etc. His "Bab Ballads" show great ability in versification.

Gilbertines (gil′bĕr-tēnz), religious order confined to England; founded by Gilbert of Sempringham (1083–1189); also called the "Order of Sempringham." Each establishment consisted of a convent for nuns under the rule of St. Benedict, and a monastery for canons regular under that of St. Augustine, besides hospitals and asylums. Sempringham afforded an asylum to Thomas à Becket during his quarrel with Henry II. At the suppression of monasteries under Henry VIII the order had twenty-one houses and eleven double convents.

Gil′bert Is′lands, or **Kings′mill Group,** extreme SE. group of Micronesia; containing sixteen small inhabited coral islands, in the Pacific, on both sides of the equator; area, 166 sq. m.; pop. est. 35,000; islands are low, and covered only with a thin layer of vegetable mold; cocoanuts, taro, and pandanus are cultivated; inhabitants have some resemblance to the Malays, are very barbarous, and some are cannibals. Missions are maintained here by the Congregationalists of Hawaii and the U. S. The group was discovered, 1788, and was occupied by Great Britain, 1892.

Gilboa (gil-bō′ä), mountain in Palestine, between the river Jordan and the plain of Esdraelon, the scene of the defeat and death of Saul and Jonathan. The ancient name is preserved in the village on the mountain, now called Jelbun. The mountain rises not more than 600 ft., but extends E. and W. about 10 m. At its N. base were the fountain and city of Jezreel.

Gild′as, surnamed SAPIENS, "the Wise," abt. 511–570; said to be the oldest historian of Britain; b. probably in Wales; founded a church and school in Pembroke; on invitation of St. Brigit went to Ireland, where he performed many miracles and founded many monasteries; on return to England founded the famous monastery of St. Gildas de Ruys; concerning his only complete work extant, "De Calamitate, Excidio et Conquestu Britanniæ," historians are divided, some regarding it as a forgery of a later period, others as genuine.

Gild′ing, covering of the surfaces of bodies with a thin coating of gold; practiced by the Egyptians and other ancient nations. The Roman gold leaf was about three times the thickness of that now used. It is often made 290,000, and sometimes 367,000, leaves to the

inch in thickness. Gilding with leaf is performed by first covering the article with several coats of hot size and whiting, called the priming; this, being smoothed, is covered with a composition called gold size, on which the leaf is laid with a soft brush. When the whole is covered and dried, the work, or any portion of it, is burnished with smooth agates or flints set in handles. Oil gilding is practiced by different methods. For large objects, especially those exposed to the weather and of metallic composition, the priming used in Paris is white lead mixed with linseed oil and a little turpentine. Book covers of cloth are ornamented with gilt letters and figures by powerful compression with a hot die, which melts the glue beneath the cloth and thus fastens the gilding; for those of leather a sizing is first laid on. Wash or water gilding is applied by means of an amalgam of gold and mercury. In other processes the gold is deposited from its solution.

Gilead (gĭl'ē-ăd), district of Palestine, bounded W. by the Jordan, E. by the Arabian desert, N. by the Hieromax, and S. by the Arnon. N. Gilead extended from the Hieromax to the Jabbok, about 35 m.; in the time of Moses was under Og, King of Bashan, and after its conquest was assigned to the half tribe of Manasseh. S. Gilead extended from the Jabbok to the Arnon, about 50 m.; in the time of Moses belonged to Sihon, King of the Amorites, and after its conquest was assigned to the tribes of Reuben and Gad. In this portion, which at one time belonged to the Moabites, were Nebo, Pisgah, and Peor. The whole district is wildly mountainous (the greatest elevation being about 4,000 ft.), but picturesque, clad with noble forests, and fertile. The N. part is cultivated and has many settlements, but the S. is practically given up to wandering tribes and is neglected.

Giles (jīlz), **St.**, Athenian monk of royal descent; lived two years with St. Cæsarius at Arles in Provence; then retired to a neighboring desert, where he lived on herbs and the milk of a hind that came of herself to his cave; became regarded as the patron of lepers, beggars, and cripples. In London, the Church of St. Giles, Cripplegate, and the leper hospital at St. Giles-in-the-Fields, and in Edinburgh the High Kirk of St. Giles commemorate his name.

Gil'gal, in Scripture, ancient city of Palestine, near the Jordan, and 2 or 3 m. from Jericho, of which no traces are extant. Here the Israelites passed the river into Canaan; here the Tabernacle rested till removed to Shiloh; here Samuel held court as a judge of Israel; here Saul was crowned; here a school of the prophets was established; and here, later, was a noted seat of heathen worship.

Gill (gĭl), **Sir David**, 1843– ; Scottish astronomer; b. Aberdeen; directed the private observatory of Lord Lindsay, 1873–76; organized and directed Lord Lindsay's transit of Venus expedition to Mauritius, 1874; connected the longitudes of Berlin, Malta, Alexandria, Suez, Aden, Seychelles, Mauritius, and Rodriguez, and measured a base line for a geodetic survey of Egypt; conducted an expedition to the island of Ascension to determine the solar parallax by observations of Mars; director of the government observatory at the Cape of Good Hope, 1879; photographed the great comet of 1882; organized the geodetic survey of Rhodesia, 1897; knighted, 1900.

Gill'iss, James Melvin, 1811–65; American astronomer; b. Georgetown, D. C.; entered the navy, 1827; in charge of the observation of occultations and transit observations made in connection with the Wilkes exploring expedition; organized the naval observatory at Washington, 1842–45; had charge of the U. S. astronomical expedition to Chile, 1849–52; superintendent of the naval observatory, 1861; captain, 1862; made many valuable improvements in astronomical instruments; author of important official reports; an original member of the National Academy of Sciences.

Gill'more, Quincy Adams, 1825–88; U. S. military engineer; b. Black River, Ohio; graduated at West Point, 1849; in the Civil War first distinguished by the successful bombardment of Fort Pulaski. In June, 1863, he was given command of the Department of the South, and in July the Tenth Army Corps; conducted the famous operations against Charleston, comprising the descent on Morris Island, the reduction and capture of Fort Wagner, and the bombardment and practical demolition of Fort Sumter from batteries 2 m. distant. His publications include "Siege and Reduction of Fort Pulaski," "A Practical Treatise on Limes, Hydraulic Cements, and Mortars," "Engineer and Artillery Operations against the Defenses of Charleston in 1863," "Report on Béton Aggloméré, or Coignet-Béton," "Roads, Streets, and Pavements," etc.

Gill'ray, James, 1757–1815; English caricaturist; b. Chelsea; a goldsmith's apprentice; ran away with strolling actors; studied art at the Royal Academy; became a good engraver, and an unrivaled political caricaturist, in which line he produced some 1,200 copper-plate etchings. His political and social caricatures appeared almost continuously, 1782–1811, and exercised a powerful influence.

Gills (gĭlz), organs of respiration in water-breathing animals. A gill may be defined as an expansion of the animal body, permeated by blood vessels, and with thin walls through which an exchange of oxygen and carbonic dioxide can take place between the water and the blood. In the invertebrates they may occur on any part of the body, but in the vertebrates they are invariably developed in connection with openings or gill slits upon the sides of the neck.

Gillyflower (jĭl'ĭ-flow-ĕr), popular name for the cruciferous plants of the genus *Matthiola*, called also by the general name of stock or stock gillyflower; are herbaceous or partly shrubby; all the common kinds are European. *M. annuus* includes the ten-weeks stocks; *M. græcus*, the Grecian stock; *M. incanus*, the purple gillyflowers, Brompton stocks, etc.; and *M. fenestralis*, the large window stocks. The va-

rieties are many, and several species besides the above are recognized. Considerable skill is

GILLYFLOWER.

required in growing fine stocks, which are favorites, especially in Great Britain.

Gil'more, Patrick Sarsfield, 1829–92; American musical conductor; b. near Dublin, Ireland; settled in Boston, 1849, where he afterwards formed the famous band bearing his name, and gave concerts in the U. S. and in Europe; organized the peace jubilees held in Boston, 1869 and 1872; and appointed musical director of the World's Columbian Exposition two days before his death; compositions include "Good News from Home," "When Johnny Comes Marching Home," "Columbia" (anthem), etc.

Gilolo, or **Jilolo** (jē-lō'lō), irregular, volcanic island in Malaysia, among the Moluccas or Spice Islands, belonging to the Dutch; separated from Celebes, which it resembles somewhat in shape, by the Molucca Passage, from Ceram by Pitt's Passage, and from New Guinea by the Gilolo Channel; area, 6,410 sq. m.; produces spices and fruits, horses and cattle, gold dust, edible birds' nests, and pearls. Pop. abt. 120,000.

Gilsonite (gīl'sŭn-īt), asphaltic mineral that occurs in veins in the Uintah Mountains, Utah; has also been called Uintahite. It is considered a true asphalt, and in many respects resembles the bitumen of the Dead Sea. It is a lustrous, black, friable solid with a specific gravity of 1.065 to 1.070.

Gim'bals, pairs of brass or copper rings in which are mounted a ship's compasses, chronometers, or barometers. One of the rings turns on a horizontal axis, the second ring, within the first, turns upon an axis at right angles with that of the first. The object is to keep the instrument right side up in spite of the pitching and rolling of the ship.

Gin, alcoholic liquor distilled generally from rye and barley and flavored with juniper; made originally in Holland, whence it is called "hollands," and still made extensively at Schiedam, Gouda, and Amsterdam. English gin is made from a mash of malt, rye, and potatoes, rectified by one or more distillations, and flavored with various substances, such as the oil of turpentine, oil of juniper, coriander seeds, cardamons, capsicum, etc. The oil of juniper or of turpentine givès gin a diuretic quality; but its abuse is a fruitful cause of kidney disease and cirrhosis of the liver, with consequent dropsy.

Ginckell, or **Ginkel** (gīn'kĕl), **Godart van,** 1630–1703; Dutch military officer in the service of William III of England; b. Utrecht; went to Ireland with the king, 1690; commanded a body of horse at the battle of the Boyne; on the king's return was left as commander in chief in Ireland; reduced Ballymore and Athlone, defeated St. Ruth at Aghrim, finally captured Limerick, for which he was created Earl of Athlone, 1692; afterwards commanded the Dutch troops under Marlborough in the Low Countries.

Gin'ger, scraped and dried rootstock of *zingiber officinale*, a plant of the order *zingiberaceæ*, a native of Hindustan, but cultivated in the E. and W. Indies and in Sierra Leone. Its medicinal virtues reside in its root, of which there are two varieties, the black and the white

GINGER PLANT.

or Jamaica ginger. In commerce the whole ginger is called race ginger. Ginger is used both for cooking and as a medicine. Its odor is aromatic and characteristic, its taste spicy and pungent. It is a grateful stimulant and carminative, and is chiefly used, either alone or in combination, in disorders of the alimentary canal.

Ging'ham, cotton fabric woven from colored yarn, either plain or in checks or figures. Ginghams were originally made in Asia by hand, but are now made very extensively in Europe and the U. S. by power machinery. Great Britain is the principal seat of manufacture.

Gink'go, name of coniferous tree of the yew alliance; native of China and Japan and com-

mon under cultivation in the U. S. and Europe; has wide, flat leaves, in form and variation recalling the leaflets of the maiden-hair ferns. The seeds reach the size of a walnut, and are largely eaten in China and Japan. The Japanese esteemed the tree as sacred, and planted it round their temples. The tree is prized for its timber, which resembles that of pine.

Ginseng (jĭn'sĕng), root of perennial herb formerly called *panax quinquefolium*, but now placed in the genus *aralia*. The Chinese ginseng is probably derived from another species of the same genus. The root of the plant growing in the U. S. is of interest or value chiefly

GINSENG.

as an export to China, where it is supposed to possess remarkable virtues in the treatment of nearly all diseases. Within recent years its cultivation in the U. S. has largely increased, but the root of the wild plant is preferred. The claims of vendors of ginseng seed as to the enormous profits obtained from its culture must be taken guardedly. Ginseng does not appear to possess marked therapeutic value in any disease. In old times the ginseng of Manchuria was considered the most efficacious; now that of Korea is preferred.

Gioberti (jō-bĕr'tē), **Vincenzo**, 1801–52; Italian philosopher and statesman; b. Turin; priest and Prof. of Theology in the Univ. of Turin, 1825; court chaplain to Charles Albert, 1831–33; exiled, 1833, for promoting the Liberal movement; spent eleven years teaching in Brussels; brought out his "Civil and Moral Supremacy of the Italians," which was hailed with enthusiasm in Italy; recalled, 1848; Premier of Sardinia, 1848–49; ambassador at Paris, 1849–51. In his "Civil Renovation of Italy" he criticises the conduct of parties in the movement of 1848, and declares the end of his efforts to have been "to establish in Italy a Piedmontese hegemony, and in Europe the moral supremacy of Italy." Gioberti refused to submit to the papal condemnation of his "The Modern Jesuit," a severe and passionate reply to the attacks of the Jesuits, and all his works have been placed on the Index.

Gioja (jō'yä), **Melchiorre**, 1767–1829; Italian political economist; b. Piacenza; received holy orders; historiographer of the Cisalpine republic, imprisoned for his republicanism, and dismissed, 1803, for his treatise on divorce; ultimately intrusted with the elaboration of the statistics of the kingdom of Italy; was a disciple of Bentham and Locke; his works are numerous.

Gioj del Colle (-kŏl'lĕ), commercial town of Italy, province of Bari, halfway between Bari and Taranto; believed to have been founded in the sixth century, and in its neighborhood, especially at Monte Sannace and Santa Sophia, ancient vases, as well as Græco-Roman coins, have been found.

Giordani (jōr-dä'nē), **Pietro**, 1774–1848; Italian Benedictine and author; b. Piacenza; Prof. of Latin and Italian Rhetoric at Univ. of Bologna, 1800–15; is regarded as the father of Italian epigraphy.

Giorda'no, Luca, 1632–1705; Italian painter; distinguished for the variety of his styles and the surprising amount of his work, which brought him wealth and fame. His works are numerous, and include frescoes (in the Escurial at Madrid and elsewhere) and easel pictures, of which may be named "David with the Head of Goliath" and the "Rape of the Sabines," at Dresden; the "Slaughter of the Innocents," at Munich; and "Venus and Mars with the Graces," in the Louvre.

Giorgione (jōr-jō'nä), **Giorgio Barbarelli**, called GIORGIONE, or "the big," from his great stature, 1477–1511; Italian artist; b. Castelfranco. Much of his work was done in fresco on walls and façades, and perished from time and weather. His portraits rank with the work of the greatest masters. One of undoubted genuineness and of great beauty, "The Concert," in the Pitti Palace at Florence, is a fine example of his best style.

Giotto (jŏt'tō), called also GIOTTO DI BONDONE, from his father, and by some AMBROGIOTTO; 1276–abt. 1337; regenerator of Italian art; b. near Florence; speedily excelled his master, Cimabue, and was the first to discard the Byzantine style and give life to art by making his works truly reflect nature. His portraits of Dante and other eminent Florentines, on the walls of the chapel of the Podestà in Florence, are said by Vasari to be the first successful attempts at portraiture. Boniface VIII summoned him to Rome, where he designed his famous mosaic of the "Navicella," representing the disciples at sea in a tempest and Christ raising Peter from the waves. Once, when asked for a sample of his art to show to the pope, he is said to have drawn a perfectly round O with a single stroke of his pen, hence the proverbial "round as the O of Giotto." About 1306 he executed in the chapel of the Madonna dell' Arena, Padua, his forty-two paintings representing the life of the Virgin. He also painted the sacraments for the Incoronata in Naples. Giotto excelled also in sculpture and architecture. The famous campanile of Florence, erected 1334, was from his designs.

Giovan'ni Bologna (bō-lōn'yä). See BOLOGNA.

Giovanni da Pisa (pē'zä), called also G. PISANO, 1240–1320; Italian sculptor and architect; b. Pisa; works include the famous Campo Santo, Castel Nuovo and Church of Santa Maria Nuovo, Naples; façade of the cathedral in Siena; the great tribune in the cathedral at Pisa, the most important part of the cathedral at Prato, and the convent and church of the Dominicans in that city.

Gip'sies. See GYPSIES.

Giraffe (jĭ-răf), or **Camelopard** (kă-mĕl'ō-pärd), ruminant mammal of Africa, whose habitat formerly extended from the Cape of Good Hope almost to Egypt, but has become much restricted through the colonization of the country and the persecutions of sportsmen. It is the only species of its genus or of the family *Giraffidæ*. The shortness of its body,

GIRAFFE.

the length of its legs, the slope of its dorsal line, the excessive length of its neck, the persistent, bony horns covered with skin, and the extensile tongue, which can be twisted around the twigs and leaves, are all remarkable characteristics. The giraffe feeds chiefly on leaves. It runs with an awkward amble, and is not very swift. The greatest height reported is about 18 ft., so that it is the tallest living animal. It is hunted for its skin, which makes good leather.

Giraffe, a constellation. See CAMELOPARDALIS.

Giraldus Cambrensis (jĭ-răl'dŭs kăm-brĕn'sĭs), or **Gerald' de Barri',** abt. 1147–abt. 1220; ecclesiastic and author; of Norman descent on his father's side; b. at the castle of Manorbeer, near Pembroke, S. Wales. The last seventeen years of his life were spent in studious retirement. He spent eight years in the Univ. of Paris; was made Archdeacon of Brecknock in 1172. He was a restless, ambitious ecclesiastic, refusing in 1190 the bishopric of Bangor and in 1191 the bishopric of Llandaff in the hope of being made Bishop of St. David's. He was a witty, brilliant, but egotistical writer. His most famous books, both written in Latin, are the "Topography of Ireland" (1188) and the "Itinerary through Wales" (1191).

Girard (zhē-rär'), **Jean** (GRÉGOIRE), 1765–1850; Swiss educator; b. Fribourg; entered the Franciscan order; became acquainted with Pestalozzi in Bern; recalled to Fribourg to take charge of the primary school confided to the Franciscans by the municipality; soon made the school the rival of the schools of Fellenberg in Hofwyl and of Pestalozzi in Yverdon. Church difficulties led to the suppression of his system; he retired, 1823; Prof. of Philosophy in Lucerne, 1828–34.

Girard (jē-rärd'), **Stephen,** 1750–1831; American philanthropist; b. near Bordeaux, France; settled in Philadelphia, Pa., 1769; engaged in the American coasting and W. India trade and other business; became a private banker (1812) and the wealthiest man in the U. S.; loaned the National Government several millions during the War of 1812–15; was very eccentric in his habits, a freethinker, ungracious in manner, ill-tempered, and lived and died without a friend; but was always a liberal benefactor of the public charities, and even of churches, which he despised. During several yellow fever seasons in Philadelphia he was active in relieving distress by free expenditure of money and personal care of the sick; and at his death nearly all his estate was bequeathed to various charitable and municipal institutions of Philadelphia and New Orleans, and to the founding of the Girard College for orphan boys.

Girard Col'lege, educational institution in Philadelphia, Pa., founded by the bequest of about $8,000,000, left by Stephen Girard, for the benefit of poor white male orphans, who are admitted between the ages of six and ten, and, according to the will of the founder, are to be apprenticed to some industrial occupation when between the ages of fourteen and eighteen. The buildings are 2 m. NW. of the old state house, in a fine enclosure of forty-one acres. The principal building (169 ft. long, 111 ft. wide, and 97 ft. high, with fine Corinthian columns, each 55 ft. high) is by far the best specimen of Greek architecture in the U. S. It is built mainly of white marble, with no inflammable material, as nearly as possible in accordance with minute directions left by Mr. Girard, according to whose will no minister or ecclesiastic of any sect or Church is allowed to visit the premises on any pretext, or to have any connection with the institution. The construction of the buildings was begun 1833 and finished 1848. In 1906 the productive funds amounted to $22,294,550; the value of grounds, buildings, and equipments was reported at

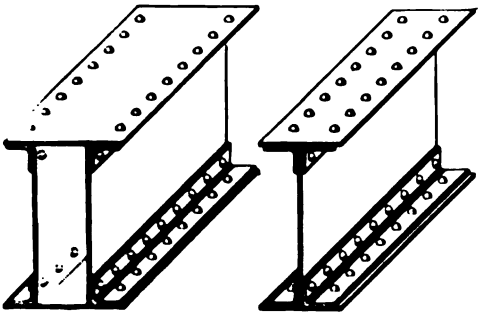
$3,500,000; professors and instructors, 64; students, 1,736.

Girardin (zhē-rär-dăn'), **Émile de,** 1806–81; French journalist; b. Paris; natural son of Comte Alexandre de Girardin; after connection with several publications, was editor of *La Presse*, 1836–56; *La Liberté*, 1866–70, and *La France* after 1874; attached to the *Journal Officiel*, 1872; influential in establishing savings banks and publishing cheap and good literature; acquired much political power; persuaded Louis Philippe to abdicate, 1848; opposed Napoleon III after 1851; became a Senator, 1870; advocated changing France to a federal republic, 1871; published many political brochures, besides "Questions of My Time," "Man and Woman," "Grandeur and Decline of France: Questions of the Years 1874 and 1875," and other works.

Girardin, François Auguste Saint Marc, 1801–73; French educator; b. Paris; early became a journalist and politician; received prizes from the French Academy for papers on Lesage (1822), on Bossuet (1827), and for his "View of French Literature in the Sixteenth Century"; succeeded Guizot as Prof. of History at the Sorbonne, 1831; exchanged chair for that of French Literature and Poetry, 1834, and for more than thirty years delivered lectures, often to an audience of 3,000 or 4,000 people; succeeded Sainte-Beuve as conductor of the *Journal des Savants*, 1869; was a man of enormous acquirements.

Girasole (jĭr'ă-sōl), precious stone of various colors and qualities, but all distinguished by a strong, deep-reflected light. The fire opal and quartz resinite are among its varieties. Fine specimens bring high prices. This stone is found in many countries, but good specimens are rare. The same name is given to several other minerals which afford bright tints in a strong sunlight.

Gird'er, beam or truss. A simple girder is one supported at its two ends, while a continuous girder is supported at its ends and at one or more intermediate points. Wrought-



Box Girder. Plate Girder.

iron and steel I-beams are extensively used as girders in sizes up to 20 in. in depth and 40 ft. in length. Plate girders are made by riveting four angle irons on a vertical plate, and then generally adding two narrower cover plates; these are much employed for bridges of from 30 to 100 ft. span. A box girder has two web plates which inclose a rectangular space between them; these are less frequently used than plate girders. Solid I-beams and plate girders are employed in the construction of buildings and bridges. For bridges from 100 to 200 ft. in length the lattice girder is a favorite form; this consists of angles and cover plates like the plate girder, but the web is made up of diagonal members instead of a solid plate. In Europe lattice girders or trusses are used for long span bridges, while in the U. S. pin-connected trusses are employed, and to these the word girder is not generally applied. In a plate girder the covers and angles constitute the flanges, while in a lattice girder these are generally called the chords. When the girder is supported at its two ends, as is generally the case, the top flange is in compression and the lower flange is in tension, while a solid web is under shearing stress.

Gir'dle of Ve'nus, very aberrant jellyfish; occurring in the Mediterranean, and belonging to the ctenophores. In its early stages it is ovoid and resembles its allies, but as it grows larger it elongates at right angles to the major axis of the body, so that when adult it is converted into a ribbonlike organism which may attain 5 ft.

Girgeh, or **Geergeh** (jĕr'jĕ), Egyptian town; of Christian origin; on the Nile; about 108 m. below Thebes and 12 m. from the ruins of Abydos; formerly the capital of Upper Egypt, and a town of fine appearance, with its palm trees, eight minarets, and Roman Catholic monastery (the oldest in Egypt), standing about a quarter of a mile from the river. The Nile is now rapidly washing it away.

Girgenti (jĕr-jĕn'tē), town of Sicily; province of Girgenti; 84 m. SSE. of Palermo; founded 584 B.C. by a Greek colony from Gela, at the foot of an older acropolis called Camicus. In the days of its greatest prosperity Agrigentum, or (Greek name) Akragas, contained 200,000 inhabitants, and including suburbs the population is said to have reached 800,000. The government, though sometimes in the hands of a tyrant, was generally free and independent till the time of the Punic wars, when the city became a Roman possession, and soon began to decline. In A.D. 826 it was taken by the Saracens, who held it nearly 300 years; since that time it has shared the changing fortunes of the island. Conspicuous everywhere rise vast temples, more or less in ruins, which bear splendid witness to its former greatness. Among these are the temple of Concord, a beautiful Doric structure, and one of the best preserved of all the ancient temples; the temple of Juno, also in partial preservation; and the temple of Jupiter Olympius, the largest in Sicily, and still imposing in its ruins. Pop. (1901) 25,024.

Girondists (jĭ-rŏn'dĭsts), French political party of the Revolution, named from its leaders, the deputies of the department of Gironde. Its most prominent members were Vergniaud,

Gensonné, Guadet, Brissot (from whom they were sometimes styled Brissotins), Condorcet, Ducos, Boyer-Fonfrède, Louvet, Pétion, Valazé, Buzot, Barbaroux, Isnard, Lanjuinais, Carra, and Rabaut Saint-Étienne. They promoted the proclamation of the republic (September, 1792), but opposed the ultra-revolutionary party, called the Montagnards, who charged them with plotting against the unity of the republic and aiming at a federal organization. On May 31, 1793, twenty-two of them were arrested, and on October 31st twenty-one were executed. The other Girondist leaders escaped, and, after vainly attempting to revolutionize several departments, were extirpated.

Girton (gèr'tŭn) **Col'lege,** educational institution for women at Cambridge, England; incorporated, 1872; course occupies three years, half of each year being spent in residence; instruction is given to a large extent by members of Cambridge Univ.; organization is essentially similar to that of Newnham College. The students are admitted to the honors examinations of Cambridge Univ., and receive certificates stating what examinations they have passed, but do not obtain degrees.

Gis'co, name of three Carthaginian generals: (1) a son of Hamilcar, who by the defeat of the Carthaginians by Gelo at Himera, 480 B.C., was forced to go to Selinus, where he established himself; (2) a son of Hanno, distinguished, 340 B.C., in the war against Timoleon; (3) the commander of the Carthaginians at Lilybæum.

Gitschin (gĭch'ĭn), town of Bohemia; 50 m. NE. of Prague; noted for the encounter which took place here (June 29, 1866) between Prince Frederick Charles of Prussia and the Austrian general Clam-Gallas, in which the latter was defeated.

Gittith (gĭt'tĭth), ancient Hebrew musical instrument, supposed to have been taken by King David from the Philistine city of Gath to Jerusalem; word appears in titles of Psalm viii, lxxxi, and lxxxiv, possibly composed f r use with this instrument.

Giudici (jō'dē-chē), **Paolo Emiliani,** 1812–72; Italian author; b. Sicily; removed to Florence, 1840, and, 1844, published "History of Italian Literature"; professor at Pisa, 1849–52, and, 1859, Prof. of Æsthetics at the Academy of Fine Arts in Florence, and its secretary; also published "History of Italian Municipalities," "History of Fine Arts in Italy," "History of the Italian Theater," etc.

Giulio Romano (jō'lē-ō rō-mä'nō), properly GIULIO GIANUZZI or DEI GIANUZZI; called also G. PIPPI, as being the grandson of Filippo or "Pippo," 1492–1546; painter and architect; b. Rome. As a painter much of his reputation has been due to his association with Raphael, who held him in high esteem, intrusted to him the execution of important works, and, dying, confided to him, along with Gianfrancesco Penni, the finishing of his uncompleted pieces. His most important works are the "Defeat of the Giants" and "Life of Psyche," in the Palazzo del Tè at Mantua.

Giurgevo (jōr-jū'vō), town of Roumania, on the Danube; opposite Rustchuk; 40 m. SW. of Bucharest; exports corn, salt, and petroleum; settled by the Genoese, under the name of St. George, in the fourteenth century; conspicuous in the wars between Turkey and Russia since 1771. Pop. (1899) 13,978.

Gizeh (gē'zē). See GHIZEH.

Gla'brio, important family of the Roman plebeian gens Acilia, of which the most distinguished name is that of MANIUS ACILIUS GLABRIO, who became tribune of the people, 201 B.C.; a decemvir of sacred rites, 200; prætor, 196; consul, 191; conducted with success the war in Greece against Antiochus III of Syria and his allies; triumphed in 190, and after 189 B.C. withdrew from public life. Another of the same name was prætor urbanus, 70 B.C.; consul, 67; proconsul in Cilicia, 66, where, after an inglorious campaign against Mithridates, he was succeeded by Pompey; a pontiff, 57 B.C. He was a grandson of P. Mucius Scævola, and had a high reputation as a jurist.

Gla'cial Drift. See DRIFT.

Glacial Pe'riod. See PLEISTOCENE PERIOD.

Glacier (glā'shĕr), a stream or sheet of ice fed by snows on mountains or plateaus, and slowly descending to lower levels where it melts away. The ice of which glaciers are composed has a granular, brittle texture, due to the air bubbles which permeate it. Four types of glacial form may be distinguished: (1) *Alpine glaciers,* which accumulate in high reservoirs separated by sharp ridges, and descend in long, narrowing ice tongues along steep valleys to lower ground. Short glaciers, melting away on the mountain slopes, are called glaciers of the second order, in distinction from the larger ones. The Alps possess 249 glaciers of the first order and 906 of the second. The greatest of these is the Aletsch glacier, 15 m. from head of reservoir to end of ice, the glacier proper occupying 10 m. Glaciers of the Alpine type are found in the Pyrenees, Caucasus, Himalayas, T'ien Shan, Cordilleras of N. and S. America in high latitudes, and the New Zealand Alps. (2) The *Malaspina glacier* of the St. Elias range of Alaska alone represents the second type of form, in which the upper parts of the feeding glaciers correspond to the Alpine type, but in which the descending streams unite and broaden out in an extensive ice plain on the lower ground in front of the mountains which gather their snows. The Muir glacier, 200 ft. high, has a width of 3 m. where it falls into Glacier Bay. (3) The *Scandinavian type,* in which a broad sheet of ice accumulates on a mountainous plateau without sharp dividing ridges, and gives forth from its margins many ice tongues which descend into the valleys. The largest snowy ice field of this kind is the Justedalsbraer, with an area of 350 sq. m., giving rise to twenty first-order glaciers and many smaller ones. (4) The fourth type is found in Greenland, where nearly the whole country is drowned under a heavy ice sheet. The area of the Greenland sheet is estimated at 330,000 sq. m.

WEST END OF COLLEGE FIORD, ALASKA.
[illegible] AND SMITH GLACIERS DESCEND BY A SERIES OF CASCADES.

THE GORNER GLACIER, SWITZERLAND.
SEEN FROM THE GORNERGRAT.

THE UNTER-AAR GLACIER, SWITZERLAND.
ICE PINNACLES VENEERED WITH WASTE.

LOOKING ACROSS THE UNTER-AAR GLACIER.
CREVASSES AND MEDIAL MORAINE.

THE GREENLAND GLACIER ENTERING THE SEA.
[illegible] MILES IN WIDTH; SHOWS CREVASSES AND SMALL ICEBERGS.

THE MUIR GLACIER, ALASKA.
ITS CLIFFS RISE 200 FEET, ITS TOTAL HEIGHT IS 900 FEET; THEREFORE MUCH OF IT LIES BELOW THE WATER SURFACE.

AN ICEBERG OFF THE COAST OF LABRADOR.
RISES OVER [illegible] FEET OUT OF THE WATER.

AN ICEBERG WHICH HAS SHIFTED ITS PLANE OF EQUILIBRIUM.

GLACIERS AND ICEBERGS.

The inland ice has been traversed by many Arctic explorers, including Nordenskiold, Jensen, Nansen, and Peary.

The main features of a glacier are: (1) The *moraines* or ridges of débris, composed of bowlders and gravel derived from the sides of the valleys through which the glacier passes, and deposited as it wastes away. (2) *Crevasses*, which are transverse, longitudinal, and lateral or marginal. The transverse crevasses are formed by the breaking of the ice as it falls over precipices; the longitudinal are probably formed by pressure causing the ice to separate in a transverse direction to the line of pressure; and the marginal are formed by strain given to the ice by the more rapid motion of the middle portions. (3) The veined structure. The veins are transverse from longitudinal pressure, longitudinal from lateral pressure, as when the glacier is squeezed through a narrow part of the valley, and oblique from the pressure producing the marginal crevasses. (4) Dirt bands, appearing as curved lines across the glacier, with their concavities looking down the valley, formed by the compaction of débris into the transverse crevasses, and the subsequent denudation of the surface. As the middle portions move faster than the lateral, the curves take the position described. (5) *Moulins*, formed by the descent of rivulets into deep cracks, excavating shafts hundreds of feet deep, down which the falling water reverberates like thunder. (6) Glacier tables, slabs of rock resting on pillars of ice situated upon the surface of the glacier. The pillars are formed by the melting of the ice away from that on which the slab rests. (7) Glacier marks, grooves, or denudations, formed by the rubbing or plowing of the bowlders which the glacier carries, imbedded in its sides, against the surfaces of the rocks in its pathway. These are not only observed along the sides of the valleys through which existing glaciers pass, but in valleys from which glaciers have long since disappeared. Glaciers move downward at the rate of from 18 to 24 in. a day, till on the lower levels they melt into a muddy stream of ice-cold water. See ICEBERG.

GLACIER CARRYING DOWN STONES AND RUBBISH.

Glad'iators, in Roman antiquity, men who fought with each other or with wild animals at the public games. They were originally captives, slaves, or condemned criminals; but under the republic free-born citizens, and under the empire knights, senators, and even women, fought in the arena. Professional gladiators were trained at Rome, Capua, and Ravenna by overseers. When a gladiator was wounded the audience called out "Habet," and he had to lower his arms. If the people wished him to be killed they turned up their thumbs, while the pressing down of thumbs or the waving of handkerchiefs expressed the desire that his life be spared. They were divided into many classes, distinguished by the manner in which they fought or the weapons they used. Gladiatorial contests were first exhibited at Rome, 264 B.C., and continued till A.D. 404, when they were abolished by Honorius. After Trajan's triumph over the Decians more than 10,000 gladiators were exhibited. Rome was imperiled abt. 72 B.C. by a rebellion of gladiators.

Gladiolus (glā-dī'ō-lŭs), genus of plants of the iris family. Most of the species have bulbs and are S. African. The *Gladiolus segetum* and *communis* of Europe at one time were

COMMON GLADIOLUS.

prized in medicine. The starchy bulbs of some African species are used as food; but the genus is chiefly noteworthy for its beautiful flowers, the ornament of almost every garden. Many splendid varieties have been produced by cultivation and hybridization.

Glad'stone, William Ewart, 1809–98; English statesman; b. Liverpool; graduated at Oxford, 1831, and entered political life and Parliament, 1832. In 1834 he was appointed by Sir Robert Peel a junior lord of the treasury, and, 1835, Under Secretary of Colonial Affairs. He became successively a member of the Privy Council, vice president of the board of trade, and Master of the Mint. In 1843 he succeeded Lord Ripon, but, 1845, he resigned his office, and soon after became Secretary for the Colonies under Peel. Concurring in Peel's free-trade measures, he resigned his seat for Newark, 1846, and, 1847, was chosen to represent the Univ. of Oxford. In 1853 he introduced his celebrated budget in a series of addresses, which were pronounced by Lord John Russell the "ablest expositions of the true principles of finance ever delivered by an English statesman." In 1858, under Lord Derby, he was appointed Lord High Commissioner Extraordinary to the Ionian Islands; and, 1859, under Palmerston, again Chancellor of the Exchequer.

From this time Mr. Gladstone was classed as an advanced Liberal. In 1865 he represented Lancashire, and, 1868, Greenwich. After Palmerston's death, 1865, he became leader of the House of Commons; but a reform bill introduced by him was defeated, and he resigned. In 1868 he introduced resolutions in favor of the disestablishment and disendowment of the Irish Church, and a bill was passed by the Commons, but rejected by the Peers. In December, Gladstone succeeded Disraeli as Premier. The Irish Church bill was passed at the session of 1869, and the Irish Land Act, 1870. In 1873 he introduced for the reform of university education in Ireland a bill which led to his resignation; but he was recalled to his post within a few days, Disraeli having declined to form a cabinet. In the election of 1874 Disraeli became Premier and Gladstone retired from the leadership of his party.

For six years he occupied himself with literary and historical studies; but, 1880, the Liberal party came back with an overwhelming majority and Gladstone again became Premier. Conditions were not propitious for a peaceful administration. Troubles in S. Africa, in the Sudan, in Egypt, and in Ireland did not, however, prevent the Government from dealing with domestic concerns. In 1885 Gladstone carried a vast scheme of parliamentary reform by which the constituencies were arranged in more nearly proportionate divisions. Irish members were an element of turbulence and uncertainty. At length they joined with the Conservative party on one clause of the budget, and the Government was defeated. Though Gladstone resigned and Lord Salisbury became Prime Minister, the new government had not a working majority. At the general election, 1885, the Liberals were overwhelmingly victorious, and for the third time Gladstone was called to the head of affairs.

On coming into power he shocked and alienated many friends by introducing, 1886, a bill for the establishment of an Irish parliament, which opened one of the most violent periods of British parliamentary agitation. The defection of Gladstone's former friends and the formation of the Liberal-Unionist party caused the defeat of the Government. For six years Gladstone led the Opposition and advocated autonomy against the coercive policy of the Conservatives, but in February, 1893, returned to power for the fourth time, he introduced the measure for Irish self-government, which, modified, passed the House of Commons in September by a majority of 34, but was thrown out in the House of Lords by a vote of 419 to 41. On account of failing eyesight, Gladstone retired from the premiership March 2, 1894. He died at Hawarden, and was buried in Westminster Abbey. His most important literary works are: "The State in its Relations with the Church," "Studies on Homer and the Homeric Age," "Juventus Mundi," "The Vatican Decrees," "Gleanings of Past Years," "The Irish Question."

Glaisher (glā'shĕr), **James,** 1809–1903; English meteorologist and aëronaut; b. London; 1833–36, assistant at Cambridge Observatory; 1836, assistant in astronomical department of the Royal Observatory; 1840–47 superintendent of the magnetical and meteorological department; founded the Royal Meteorological Society; became F. R. S., 1839, for his meteorological observations made in balloons; attained, 1863, the height of 37,000 ft. above the earth's surface; 1865, president of the meteorological department of the British Board of Trade; author of numerous works on astronomy, meteorology, and the science of numbers, including "Hygrometrical Tables," "Travels in the Air," an edition of Flammarion's "Atmosphere," and of Guillemin's "The World of Comets," and the completion of the "Factor Tables" begun by Burkhardt, 1814, and continued by Dase, 1862–65.

Glands, general name of a variety of organs whose functions are to elaborate the various products of secretion from the blood, to perform certain offices connected with absorption and assimilation, and to assist in preparing and maintaining the circulating fluid in a normal condition. Anatomists usually divide glands into true secreting glands, having ducts or canals from which the secretion is delivered, and ductless glands. Of the first class are the mammary, salivary, and lachrymal glands, the liver, kidneys, etc., each of which furnishes a peculiar secretion or excretion, according as the product is to be used again for digestion or assimilation, as the milk or saliva, or to be cast out, as the urine and the perspiration. The parotid glands are situated one in front of each ear; their swelling produces mumps. These glands have a structure with reference to the arrangement of the nucleated and epithelial cells and tubes or cavities which form a part of their com-

position, and the cells which effect the separation of their special secretions from the blood are generally in the relation of epithelium cells to the inversions of the skin or mucous membrane that form the greater part of their follicles or tubuli, and in the act of secretion absorb from the blood its watery and saline ingredients, adding to them a substance peculiar to each gland; as pancreatin in the pancreatic juice, and the biliary salts of the hepatic secretion. Sebaceous glands

MUCOUS GLANDULE FROM THE CAVITY OF THE MOUTH.

a. Investment of areolar tissue. b. Excretory duct. c c. Secreting follicles. d. Branches of excretory duct.

are found on those parts of the skin where there is hair, which they keep soft by their oily secretion. They are also found about the ears, nose, and mouth. Of the second class, or ductless glands, are the spleen, the suprarenal capsules, and the thymus and thyroid glands. Although they pour no secretion into any duct or receptacle, they exert an influence on the blood as it circulates through them in special vessels by which it receives properties that fit it for the continued work of nutrition. Disease of these ductless glands show that their internal secretions are of importance. Goiter is due to enlargement of the thyroid gland. Addison's disease, characterized by a bronzing of the skin and extreme weakness, is due to disease of the suprarenal glands. Such diseases are now treated by dosing the patient with the extract made from healthy glands.

Glan'ders, malignant disease of the horse and other equine species; highly contagious, and may be communicated to man, but not, it is said, to other animals; occurs in two forms, depending on the parts affected. When in the lymphatic system it is called farcy; when in the nasal cavities, glanders. The pus of one will produce the other, and farcy always terminates in glanders, unless arrested. The treatment in both forms consists in good feeding, tonics, disinfectants, and detergent washes and applications, particularly carbolic acid and creosote. The administration of iodin is generally beneficial in chronic cases. When the disease is communicated to man, it is usually fatal.

Glan'vil, or **Glan'ville, Ranulf,** or **Ralph de,** d. 1190; English jurist; b. Stratford, Suffolk; 1165, became sheriff of York; custodian of Queen Eleanor at Winchester, 1173–89; captured William the Lion at Alnwick, 1174; justice itinerant, 1175; chief justiciary of all England, 1180; led an army in Wales, 1181; connected with the English Govt. in Ireland, 1185; removed from office by Richard I and imprisoned; on release joined the Order of the Cross and went to the Holy Land; died at the siege of Acre; reputed author of the earliest treatise on the Anglo-Norman judicial system, "Treatise Concerning Law and the English Constitution."

Gla'rus, capital of canton of Glarus, Switzerland; on the Linth; shut in by lofty mountains, the Gläruish, rising 6,153 ft. to the S., the Wiggis, rising 6,033 ft. to the NW., and the Schild, rising 6,010 ft. to the E.; has breweries and manufactures of cloth and calicoes; founded in the fifth century by Fridolin, an Irish monk. Zwingli was pastor here, 1506–16. In 1861 more than 500 buildings, including the old parish church, were destroyed by fire, but the town was rebuilt in a substantial manner. Pop. (1900) 4,940.

Glas'gow, city in Lanark and Renfrew, Scotland; on the Clyde, about 22 m. above Greenock where the river broadens out into the firth of the same name; is the second city in the United Kingdom, and the seventh in order among the cities of Europe. The larger and older part of the city stands on hilly ground on the bank of the river, while the remainder stretches over a gently rising slope. Originally a few scattered houses huddled beneath the cathedral walls, or straggling down the ridge of High Street toward the river, Glasgow has gradually absorbed neighboring estates and villages, such as Gorbals, Anderston, Calton, etc., still traceable by their ancient names, till it now covers 12,382 acres. The Kelvin, renowned in song, crosses its W. portion in a S. direction, and joins the Clyde 2 m. below Glasgow bridge. The Molendinar Burn, around which clustered the nucleus of old Glasgow, is now a roofed-in sewer. The river Clyde, once a stream easily fordable on foot, has been deepened till it is now navigable by the largest steamers. Here it is lined by handsome quays and spanned by nine bridges, six for ordinary traffic and three for railways.

Glasgow is substantially built, with streets for the most part wide and regular. Argyle Street, the main thoroughfare, running parallel to the river, continues under various names in one unbroken line for about 5 m. At its E. end stands the beautiful tower of the old town jail or tolbooth, now known as the Cross Steeple. Here is the site of the

Old Town, with High Street to the N., rising to the cathedral and the once aristocratic quarter of the Drygate, the Gallowgate and Trongate leading E. and W., and the Saltmarket and Bridgegate S. to the river. The principal parks are the Green on the riverside, containing the Nelson Monument; the Kelvingrove opposite the university, containing a fountain and museum; the Queen's, close to the battle field of Langside; the Alexandra with golf links and swimming pond; and the grounds of the Botanical Gardens with winter garden and plants of scientific and educational value. Notable buildings include the city chambers, post office, royal exchange, stock exchange, St. Andrew's halls, Institute of the Fine Arts, art gallery, corporation galleries, the cathedral, university, Royal, Victoria, and Western infirmaries, and William Quarrier's Orphan Homes.

Glasgow has great natural advantages, being situated in a region rich in coal and iron, and on a river without a bar and affording a ready outlet for commerce. Its commercial prosperity dates from its embarkation in the tobacco and sugar trade with the U. S. and the W. Indies, shortly after the treaty of Union. Its chief manufactures are textiles, chemicals, glass and pottery, machinery, and steamships. Steel has almost entirely displaced iron in the Clyde shipbuilding trade, and the manufacture of steel by the Siemens process is carried on in about a dozen large works. St. Mungo is said to have founded a bishopric here, 560; here Watt first began to improve the steam engine; and *The Comet*, the first boat in Europe successfully propelled by steam, was launched here, 1812. The earlier history of Glasgow is identical with that of its cathedral. At the time of Mary Queen of Scots it was but a poor town of 4,000. During the reigns of Charles I and Charles II it suffered grievously for the cause of the Covenant, which perhaps accounts for its taking the Hanoverian side in the rebellions of 1715 and 1745. Pop. (1905) 809,986.

Glasgow, Univer'sity of, noted educational institution in Glasgow, Scotland; founded, 1451; chartered, 1577; buildings erected, 1632–56, sold, 1864; present buildings completed, 1870. The university comprises a splendid pile of buildings, on the N. bank of the Kelvin, opposite West End Park; is built round a central quadrangle, and crowned by a tower and spire 278 ft. high. Besides the regular academical course, there are law, divinity, medical, and scientific examinations, degrees, and professorships. Women students are admitted, but are taught at St. Margaret's College, an affiliated institution.

Glass, the name given to every transparent body which is brittle and sonorous at ordinary temperature, becomes soft and ductile, finally melting, under the influence of heat, and which presents when broken the peculiar appearance known as the vitreous fracture. Glass in its simplest form is composed of silica—such as pure white sand and two or more alkalies, alkaline earths, or other oxides, such as lime and soda. After being sifted and mixed together the materials are put in large clay pots set in a furnace and subjected to a white heat until melted to liquid glass, which is then allowed to cool to the consistency of a thick paste, in which state it is used by the workmen. Bottles, tumblers, wine glasses, etc., are made by gathering a bit of the melted glass on the end of a long blowpipe and blowing it to fill a mold. For making plate, crown, cylinder, and sheet glass other processes are required.

The art of glass making was very early practiced among the Egyptians. Paintings on a tomb at Beni Hassan, supposed to date from abt. 300 B.C., represent Theban glass blowers at work with blowpipes very similar to those now used. Ornaments imitating precious gems, drinking vessels, mosaic, figures of deities and sacred emblems, and even coffins, show that the Egyptians had attained in the art of glass making excellent workmanship and brilliancy of color. From them the Phœnicians are supposed to have received the art, which early flourished at Sidon and Tyre. In the ruins of Nineveh have been found glass lenses, vases, and bottles, etc., one of which, dating from 719 B.C., preserved in the British Museum, is regarded as the earliest dated specimen of transparent glass. The making of glass was extensively and skillfully practiced by the ancient Greeks, and was introduced into Rome in the time of Cicero. Under Nero improvements were made and great skill was attained in the production of ornamental articles.

VENETIAN DRINKING GLASS.

In the third century articles of glass were in common use. Numerous specimens have been found in the ruins of Herculaneum and Pompeii, showing that glass was used for admitting light to dwellings in Pompeii, as well as window frames filled with a transparent talc. The perfection which the art had attained among the Romans is attested by the Barberini or Portland vase in the British Museum, said to be the most beautiful example known of glass of two layers. This was found about the middle of sixteenth century in a marble sarcophagus near Rome. After being for more than two centuries the principal ornament in the Barberini Palace in

Rome it was purchased by the Duke of Portland for £1,029. The vase is 10 in. high, composed of two layers of glass, the under one of a deep blue color and the outer of opaque white. The raised figures appear in white on a beautiful background of blue. In the thirteenth century and for several centuries after, the Venetian was the most famous glass in commerce. The principal works were at Murano, an island adjacent to Venice. Glass mirrors were probably first made here, and they became famous all over Europe. The Bohemians next acquired reputation in this art, their engraved glass becoming especially celebrated. The French early imitated the example of the Venetians, and after they had procured workmen from Venice, abt. 1666, works were erected at Tourlaville. In 1688 Thévart introduced the method of making large plates by casting the glass instead of blowing. In 1665 the manufacture of glass was established at St. Gobain and became very successful, the products of the establishment still ranking among the first in quality.

Engraved Flagon (Clichy Glass Works).

The first positive allusions to the use of glass for windows were made by Lactantius about the close of the third century, and by St. Jerome about the close of the fourth. It is asserted by the Venerable Bede that glass windows were first introduced in England, 674; but for many centuries the use of window glass was limited to churches. Even in the sixteenth century in England and the seventeenth in Scotland only the dwellings of the wealthy were provided with glass. The manufacture of window glass was conducted in England as early as 1439, and soon after 1557 flint glass also was made in London. The production of plate glass was undertaken, 1670, at Lambeth by the Duke of Buckingham, who imported Venetian workmen. Other glass factories sprang up in different parts of the kingdom. The quality of the English crown glass is unrivalled. Glass appears to have been one of the earliest manufactures introduced into the U. S. A glass factory was built by Robert Hewes in Temple, N. H., 1780. Crown glass was first made in Boston, 1793, and became celebrated. Crown glass works were established in E. Cambridge, 1825, and others for bottles and for flint glass about the same period.

Optical glasses are probably as old as glass, for it is not likely that men who worked in this material would not almost at once observe the magnifying properties inherent in every piece thicker in the middle than at the sides. A lens was found in Nineveh, and China chronology states that the Emperor Chan, 2283 B.C., observed the planets through an optical glass. A tombstone in Florence declares that spectacles were invented by Salvino d'Armato, who died in 1317. Kepler (1571) is regarded as the modern inventor of the telescope, which was rediscovered in 1606 by Hans Lippershey, of Holland. Glass for optical instruments is the most difficult to make. Cut glass is glass having a surface ground and polished into facets. It is much used for table articles.

Coloring or staining glass is a very important part of the manufacture, involving much skill. At one time dark *massive-colored* glasses were generally used. By color *en masse* we mean that which is tinted all through. At present hues are conveyed by covering a body of pure flint glass with one or more thin coatings of intensely colored glass, whether of blue from cobalt, green from iron and copper, or ruby from gold. The more metallic coloring oxide is employed the less lead is used, so as to equalize the composition. Massive colors produce a shadowy blackness, which was, however, turned to account by the artists of the Middle Ages by *leading* their tints of blue, red, yellow, amethyst, and green into windows, either thicker or thinner or solid or *cased* glass as the required effects suggested.

There are six kinds of glass, each requiring a peculiar fabrication and a peculiar building and furnace. These are bottle, crown, sheet-window, plate, flint, and colored glass. As a rule, glass-houses are conical, and all the processes are conducted on one floor. All furnaces are buildings of circular or rectangular form, four different kinds being needed, which are built together or separately. Of these one is the main furnace, employed for supplying the melted glass from the pots in which it is contained; of the others, one is the annealing furnace, in which the wares are annealed or tempered when made or while making, and the other is employed for baking the raw materials combined, and called frit or batch. There is also the flashing furnace, where articles being made are rewarmed or restored to sufficient softness as they cool. The furnace for baking and partly fusing the frit is called a calcar, and that for annealing a leer. Annealing is an important process with glassware. If not well done, the articles will, it may be months afterwards, break suddenly. This results from a different arrangement of the molecules caused by sudden cooling.

Pieces or objects of ancient glass dug from the ground are often exquisitely beautiful. Sometimes they are like the richest and most varied wings of butterflies or the feathers of peacocks, presenting every shade of every color known, and at other times they resemble metal. Soluble or water glass is a simple silicate of soda which is perfectly soluble in hot water, but which becomes hard when exposed to the air. It is used for many purposes—as

a glazing which resists water and fire, as a cement for glass, and as glue or isinglass in coloring.

Glass'-crab, name given to the young of the spiny lobsters, on account of its transparent character. These young are very thin and leaflike, and formerly were regarded as adults.

Glass'ites, followers of John Glass, a Scottish minister who became pastor at Tealing, Forfar, 1791, and formed within his church, 1725, a society composed of those whom he considered truly spiritual Christians; deposed by the Assembly, 1730, he removed to Dundee and, 1733, to Perth, where he was joined by Robert Sanderman. The Glassites developed a number of peculiarities in doctrine, discipline, and worship.

Glass Paint'ing, art supposed to be of Byzantine origin, and to have arisen since the beginning of the Christian era. The oldest specimens now existing do not date farther back than the eleventh century. The windows in the cathedrals at Angers and St. Denis, the oldest of which the date is certainly known, were painted about the middle of the twelfth century. France has continued to be the richest storehouse of painted glass of the earliest style. The art reached its zenith about the middle of the sixteenth century; but in the next century had entirely declined. In the ancient glass pictures the figures were formed of pieces of stained glass, and the shadows were laid on with dark colors and fixed in the fire. Intense colors were exclusively employed, ruby and blue always predominant.

When figures came to be introduced, they were generally grotesque and distorted; but the costumes were remarkably correct. The pieces of glass were larger, and a single figure was often made to occupy a whole window, standing beneath an elaborate blue or red canopy. Not only leaves, plants, and trees, but even landscapes and buildings in perspective, appeared in the later half of the fifteenth century. After a long decline, the nineteenth century witnessed a revival in the art of painting on glass, which is now extensively practiced in France, Germany, England, and the U. S., the finest specimens being produced at Munich and New York. In earlier periods it was devoted chiefly to ornamenting cathedral windows with sacred illustrations, but it is now used for general purposes of ornamentation, embracing a wide range of secular subjects.

Glass painting, which is more properly a process of staining, differs from all other styles of pictorial art, except the painting of porcelain. The colors are different, being wholly of mineral composition, and are not merely laid on the outside, but fixed by being fused into the material. The mixture is usually laid on with a brush as in ordinary painting, and the glass being then exposed to heat, the flux melts and sinks into the body. In the history of the art two leading processes have been prominent. From the earliest period until about the middle of the sixteenth century the mosaic system prevailed. In this process the glass was colored in the manufacture, and blocks of different colors having been brought together, the outlines and shading of the design were produced by the application of an enamel color.

It seems to be conceded that the beauty of the cathedral glass of the thirteenth and fourteenth centuries was in the brilliancy of the glass and the skillful arrangement of designs and colors, and not in any enamel work. The ordinary method of glass painting, as practiced in England, is to use for the colored parts of the design pieces of glass differently colored in the process of manufacture, and to employ only one enamel color, brown, for tracing the outlines and painting the shadows of the picture upon the glass. The enamel brown, like any other enamel color, consists of coloring matter mixed with pulverized glass, called flux or enamel. When this is laid on the surface of the glass and heated in an oven or furnace, it melts, in consequence of being more fusible, while the glass is merely at a red heat; on being cooled it hardens and produces a permanent color on the surface of the glass. The various tints of yellow are the only ones that can be produced on glass without altering its surface. These are produced by applying a "stain," the principal ingredient of which is oxide or chloride of silver. On being exposed to the action of a red heat, the yellow stain penetrates the glass and imparts to it its tint.

Glass'-snake, name applied to a peculiar lizard (*Ophiosaurus ventralis*) of the S. U. S. The outward resemblance to a serpent is very striking, owing to the total absence of external limbs and the very long body, but the animal is nevertheless a true lizard. The tail is readily broken by a blow, or even by rough handling, and from this fact and its snakelike appearance the popular name is derived. The glass-snake attains a length of 2 or even 3 ft., is green above, with black markings, and yellowish below.

GLASS-SNAKE.

Glass, Sol'uble, or Wa'ter Glass, artificial silicate of soda or potash, or a double silicate of both these alkalies. It may be formed by fusing 8 to 10 parts of dry carbonate of soda or potash with 15 parts of white sand or powdered quartz or flint. Most glass is slightly soluble in water, because of the alkaline matter it contains, and the solubility is increased by heating the water. Soluble glass is applied to brick and stone walls to harden them, and is used in fireproofing, in fixing colors on cotton and paper, in making artificial stone, etc.

Glass-spon'ges, various species of sponges belonging to the genera *Hyalonema*, *Holtenia*, *Pheronema*, *Euplectella*, etc., of the family *Hexactinellidæ*. They form a firm skeleton of hyaline six-rayed siliceous spicules (see

Sponges), which, when the fleshy portions are washed away, remain hanging together, forming a framework resembling the finest spun glass. In some forms there is in addition a cable formed of long siliceous spicules which serve to anchor the sponge.

Glass-sponge.

Glauber's (glä'bèrz) **Salt**, called formerly *sal mirabile*, the neutral sulphate of soda found native in sea water, in mineral springs, and especially in the alkaline soils and waters of the W. plains and mountains of the U. S. It was formerly much used in medicine as a cathartic, but is now so employed chiefly in veterinary practice.

Glau'cias, bronze founder of Ægina; flourished abt. 490–470 B.C.; celebrated for his statues of combatants in the games; cast the chariot and a statue of Gelo, the Tyrant of Syracuse and conqueror in the chariot race at Olympia, 485 B.C.; made statues of the wrestlers Philo of Corcyra and Glaucus of Carystus, and also of Theagenes the Thasian, conqueror at the Olympian games, 480 B.C.

Glauco'ma, a disease characterized by increased tension inside the eyeball, caused by the augmented volume of the vitreous and aqueous humors. It is marked by a gradual loss of sight and by pain, often very intense. It is acute or chronic. It is a disease of advanced life, and frequently leads to blindness.

Glau'conite, a mineral of green color occurring abundantly in Secondary and Tertiary greensands and chloritic marls, and composed of silica 46 to 56 per cent, ferrous oxide 20 to 25 per cent, potash 5 to 13 per cent, alumina 4 to 14 per cent, and water 0 to 10 per cent.

Glau'cus, bronze founder of Chios, according to Herodotus, though others assign him to Samos; reputed inventor of the art of soldering bronze and of tempering it by fire and water; most celebrated work, a bronze base on which was placed a silver vase dedicated by Alyattes II, King of Lydia, to Apollo at Delphi.

Glaucus, Bœotian fisherman who, according to Greek heroic traditions, by luck ate of a divine herb and was made immortal by the gods of the sea. He followed after the ship *Argo* and prophesied to the heroes on board.

Glaucus, companion of Sarpedon, nephew of Bellerophon, leader of the Lycians, and one of the bravest of the allies of the Trojans. When Glaucus and Diomedes were about to fight they discovered that ancestral ties of hospitality bound them together, so that they separated in peace after exchanging armor, Glaucus giving his priceless gold armor in exchange for the bronze armor of Diomedes. Glaucus was finally killed by Ajax.

Glebe (glēb), in English and Scottish ecclesiastical law, the land which belongs to a church. It constitutes a part of the revenue of a benefice, and is vested in the incumbent.

Glede (glēd), bird mentioned in the authorized English version of the Bible under this name; generally believed to be the common kite of the Old World, though some make it some species of vulture.

Glee, musical composition in three or four parts, and usually of two or more movements; originally written for voices without accompaniment. It is of English origin, and appears to have sprung from the old part songs and madrigals. By degrees the distinctive marks of these several classes of compositions have been obliterated, and the name *glee* is given in a broad sense to almost any secular part song.

Gleig (glēg), **George Robert**, 1796–1888; Scottish author; b. Stirling; served in Spain against Napoleon, 1813, and in the U. S. in 1814; took church orders, and after several preferments was chaplain general of the British army, 1846–75. In 1848, a prebendary of St. Paul's; author of many works, among which are "History of British India, "Family History of England," "Memoir of Warren Hastings," "Military History of Great Britain," "Campaigns at Washington and New Orleans," "Life of Wellington."

Glen'coe, valley of Argyle, Scotland; scene of a massacre, February 1, 1692. The Macdonalds, who had been particularly offensive in their reluctance to submit to the rule of William III and Mary, were promised full pardon if they would render submission before January 1, 1692. Sir John Dalrymple, Master of Stair, taking advantage of a technical irregularity in the form of their submission, obtained a warrant from King William to extirpate the tribe. Capt. Campbell, of Glenlyon, with 120 men quartered in Glencoe, was hospitably received by the Macdonalds, but treacherously fell upon his hosts, slaying sixty men.

Glendower (glēn'dōr), **Owen** (Owain ab Gruffydd), abt. 1350–1415; Welsh chief; b. Merioneth; great-grandson of Llewellyn, the last Welsh monarch; made a barrister of London; became an esquire of Richard II's court, and, 1387, was knighted; adhered to the dethroned monarch; deprived of his es-

tates by Henry IV; mustered the men of Wales in rebellion; obtained a victory over Sir Edmund Mortimer, 1402; proclaimed himself Prince of Wales, and made an alliance with France. Earl Percy (Hotspur) and Mortimer now allied themselves with Glendower, but Percy was defeated by Prince Henry at Shrewsbury, 1403, and Glendower by the same prince twice, 1405. Glendower continued the war, and, though his power decreased, he never submitted.

Glenelg (glĕn-ĕlg′), river in Victoria, Australia; rises in the Grampian Mountains; passes into S. Australia, and, after a course of 281 m., falls into the S. Ocean E. of Cape Northumberland.

Gleyre (glār), **Charles Gabriel,** 1806–74; Swiss figure painter; b. Chevilly; was a popular instructor in Paris. Important works by him are in the museums at Basel and Lausanne; "Lost Illusions" is in the Walters collection, Baltimore, Md.

Glin′ka, Michael Ivanowitch, 1804–57; Russian composer; b. Smolensk; was one of Russia's greatest composers. His opera, "Life for the Czar," was his greatest work, and is highly popular in Russia.

Glioma (glī-ō′mă), plur. **Glio′mata,** tumor of the brain substance, or more rarely of other parts, representing in its structure the *neuroglia* or connective tissue of the nervous system; consists of a finely netted material containing many roundish nuclei; produces symptoms merely by mechanical pressure.

Gli′res (Lat., dormice), name given by Linnæus to that group of mammals usually called Rodentia.

Glis′son, Francis, 1597–1677; English physiologist; b. Rampisham, Dorset; in 1636, Prof. of Physic, Cambridge; 1639, Prof. of Anatomy, College of Physicians, London; wrote on the anatomy of the liver, rickets, the intestines, and on other subjects; practiced at London and Colchester; had a wide fame as a subtle and profound philosopher and a skillful anatomist. "Glisson's capsule" of the liver was discovered by him.

Globe Am′aranth, an annual flowering plant of the Amaranth family, well known for its globose purple or white heads of imperishable flowers—one of the kinds known as *immortelles.* This species is E. Indian. Many of the S. American species (herbs or shrubs) have medicinal virtues.

Globe, Artifi′cial, sphere on which is a map. Globes set forth the earth or heavens, and are terrestrial or celestial. On the latter the stars appear as they would if seen from the center of the earth, while the former is a copy of the earth itself, with the addition of lines or circles to determine the position of places and the movements of the sun and planets. The oldest globe is that in the Museum Borgia at Velletri, probably from the year 1225. Celestial globes of gold, on which the stars were represented by pearls, were made by the Arabs. The impetus which the Arabs gave to astronomy and geography was discouraged by the Church, which opposed the theory that the world was round. The first modern globe maker was Johann Schöner (b. 1477, at Karlstadt, Franconia), a distinguished mathematician and astronomer.

The brass circle in which most globes hang by their poles is called the universal meridian, since any given place on the earth's surface may come within it. This brass meridian is held within the broad flat circle of wood called the horizon by sliding in two grooves. The horizon in some globes is so constructed as to revolve with ease. This horizon is supported by two arms and a base forming a stand, on which it rests. By sliding the meridian the poles of the globe can assume any point from the horizon to the vertical. The brazen meridian is divided into 360 equal parts called degrees. On one side of the meridian, or the *lower semicircle,* they are numbered from 1 to 90 from the poles to the equator, to give the elevation of the former. In the upper semicircle the same numbers from the equator to the poles are used to ascertain the latitude of any point on the earth's surface. An interesting feature of the U. S. Govt.'s exhibit at the Columbian Exposition at Chicago, 1893, was a model of the earth, 63 ft. in circumference, believed to be the largest globe ever constructed. See GEOGRAPHY; MAP.

Globe′fish, a name applied to several marine fishes of the family *Tetraodontidæ.* Like other fishes of the family, they can puff themselves up by swallowing air. In this condition

GLOBEFISH.

they sometimes lose their balance, and float in a helpless state upon the water. The belly is protected by sharp spines. There are many species in the tropical seas, and one is found as far N. as Cape Cod.

Globe′flower, the common name of perennial herbs of the genus *Trollius,* of the Crowfoot family. *T. europæus* and *asiaticus* are cultivated ornamental plants. *T. laxus* is a rather rare plant of the U. S., and the only American species. The name is also applied to certain amarantaceous plants, sometimes used for the same purposes as "everlastings" or *immortelles.*

Glom′men, largest river of Norway; rises in the Dovreffeld table-land, at an elevation of

2,339 ft.; after joining the Vormen, is called the Stor-Elv, and after a course of 350 m. falls into the Skagerack.

Glo'ria, in music, one of the principal divisions of a Roman Catholic or liturgical mass, being the music to the words of the hymn, "Gloria in Excelsis Deo," etc. In masses of a diversified and elaborate character the gloria frequently embraces several movements, consisting of solos, duets, etc., and choruses. The word is also used for the doxology, "Gloria Patri" ("Glory be to the Father," etc.), and the "Gloria Tibi" ("Glory be to Thee, O Lord").

Gloria in Excel'sis De'o (Lat., "Glory to God on high," liter., "Glory in the heights to God"), title of the greater doxology, being the first words of that formula. It is also called the Angelic Hymn, because the first words were sung by the angels on the plains of Bethlehem (Luke ii. 14). It dates from the second century, and was originally the morning hymn of the Greek Church. It originally consisted of only the few gospel words. Its form was finally fixed by the fourth Council of Toledo, 633. Down to the twelfth century it was used only by the bishop, except on Easter, when it was also used by the priest.

Gloria Pa'tri (Lat., "Glory to the Father"), the lesser doxology, a very ancient ascription of praise to the Holy Trinity—a brief hymn believed to have taken its present form about the time of the Arian controversy. In the Roman Catholic Church it is recited, as a rule, after each psalm in the office and after the "Judica" psalm in the mass.

Glo'ry (in meteorology). See HALO.

Gloss, explanation written on a MS. between the lines, along the margins, or on a separate parchment, designed to explain foreign, obsolete, provincial, or technical words or obscure phrases. The Greek, Hebrew, and Vulgate texts of the Bible and the canon and the civil law were the subjects of many and often important glosses. Sometimes the gloss is more than a verbal explanation, and takes the form of a logical elucidation.

Glot'tis, the opening at the upper part of the trachea or windpipe and between the vocal chords, which by its dilation and contraction contributes to the modulation of the voice. For the purpose of breathing the glottis must be kept open, while for the process of phonation it must be kept more or less closed.

Gloucester (glŏs'tẽr), capital of Gloucester, England; on the Severn; 33 m. NNE. of Bristol. The Gloucester and Berkeley Canal enables vessels of 600 tons to ascend to the city from Sharpness Point, on the Severn. Its cathedral, begun 1088, is one of the finest in England, especially its square tower, 225 ft. high. The central tower contains the Great Peter bell, weighing 3 tons 2 cwt. Gloucester, Worcester, and Hereford form together a choir which gives celebrated annual concerts. Among institutions are the Infirmary, the County Asylum for Lunatics, the King's or College School, the Bluecoat Hospital, and a theological college. The manufactures are important, and include agricultural implements, railway material, soap, chemicals, and matches. There are shipyards, foundries, and rope works. Gloucester derives its name from a town or village called Caergloui by the Britons; became a Roman station under Aulus Plautius; and in the time of the Venerable Bede was a city, called Gleauanceastre. Pop. (1901) 47,944.

Gloucester, city and seaport (named from Gloucester, England; settled, 1623); Essex Co., Mass.; on Massachusetts Bay near the extremity of Cape Ann; comprises the villages of Magnolia, E. Gloucester, W. Gloucester, Riverdale, Annisquam, Lanesville, Bay View, and the "Harbor"; is a port of entry, and is the center of cod and halibut fisheries. The fisheries and granite quarrying constitute its distinctive industries. It is the largest fishing port in the U. S. Other industries are shipbuilding and fish canning, and the manufacture of cotton goods, clothing, cigars and cigarettes, grease and tallow, and awnings, tents, and sails. The city is also a popular summer resort, having an excellent beach 2 m. long. Pop. (1905) 26,011.

Glov'ersville, city in Fulton Co., N. Y.; on the Cayadutta branch of the Mohawk River; 44 m. NW. of Albany; derives its name from the extensive manufacture of gloves, and is the center of the glove trade of the U. S. Pop. (1905) 18,672.

Gloves, articles for covering the hands. In remote historic times they were used only for protection against cold, or thorns in harvesting crops, although in the East they were used to pass title to property, the exchange of the glove carrying with it possession. During the Middle Ages their use became more diversified, and quite common. They were worn by knights, priests, and ladies, and expressed different symbolical significations, of love, challenge (as in "throwing down the gauntlet"), submission, etc. During the reign of Louis XIV the glove came to be considered necessary to a complete toilet, and during his reign special laws were enacted for the protection of Paris glove makers. Leather is the most common material used in their production. Developments in tanning have brought into use the skins of many animals heretofore regarded as of no value. Deer, sheep, kid, and calf skins at one time were used exclusively; now the list embraces the skin of the dog, cat, rat, fox, and bear, besides that of the horse, cow, colt, kangaroo, hog, and almost every hair animal.

Some of the finest gloves are made from real kidskin and from ratskin, while coltskin has a prominent place, the fine grain deceiving everyone but an expert. Australia furnishes nearly all the kangaroo skins, many of which are used in the shoe-leather trade. Calfskins are exported from Europe, and the U. S. also yields large numbers; lambskins are supplied by many parts of the world, including

France, Spain, Austria, Turkey, and compete with the real kidskin which comes largely from the same localities, but also from the E. Indies, Switzerland, and Ireland. The general term "kid glove" does not any longer convey the idea of a real kid or the young of a goat, but any leather "kid dressed."

The work of making gloves is done by women and girls. Gloves are generally made in factories, where long tables are fitted up attached to which are sewing machines run by steam or electric power. Gloves are made in parts by several operators. When they come from the cutters they are all fitted and the parts numbered, and must be so kept that the weight and colors may not be interchanged. After the backs are corded or embroidered the end of the silk is pulled and tied, then the glove is closed, by beginning either at the upper end of the long seam and sewing toward the little finger, or with the end of the index finger and finishing with the long seam. The gussets or fourchettes and thumb having previously been put in, the gloves are bound or hemmed or banded; sometimes the buttonhole is made after this process; if lacings instead of buttons are used they are then adjusted; the buttons are next put on; after this the gloves are "laid off," usually on steam-heated forms, then tied and boxed and thus made ready for the market. In 1900 the manufacture of gloves and mittens from leather in the U. S. represented a capital investment of $10,705,599, and the total output had a value of $17,740,385.

Glow'worm, wingless and nocturnally luminous female of *Lampyris noctiluca*, and other

GLOWWORM.

fireflies of Europe. In the U. S. luminous larvæ of various fireflies are named glowworms. See FIREFLY.

Glucinum (glū-sī'nŭm) or **Beryllium** (bē-rĭl'lĭ-ŭm), a metallic element (symbol, G; atomic weight, 9.3) whose oxide is known as glucina. Glucinum in nature commonly occurs as a silicate of glucina, as in the beryl, of which gem this earth constitutes fourteen per cent, or as an aluminate, as in the chrysoberyl. The glucinum chloride, when vaporized and passed over melted sodium, yields metallic glucinum, a white malleable metal (specific gravity 2.1) which cannot be burned, even in pure oxygen.

Gluck (glŏk), **Christoph Wilibald,** 1714–87; German composer; b. Weidenwang, Bavaria; instructed in music under the direction of the Jesuits; at twenty-two was sent to Vienna to study; and later was placed under Sammartini at Milan. At twenty-six he received an order to compose an opera for the court theater and produced "Artaserse," which achieved a triumph. Other operas followed, including "Demofoonte," "Ipermnestra," and "Fedra"—all for Italian cities. Invited to the Haymarket, London, he produced there, 1740, "La Caduta dei Giganti." At Paris, Vienna, Rome, and Naples he produced many pieces, marked like "Artaserse" by innovations in style. Two of these, "Il Trionfo di Camillo" and "Antigone," won for him the Order of Knight of the Golden Spur from Pope Clement XIII. He was director of the Court Opera, Vienna, 1754–64, and during that period composed the "Orfeo ed Euridice," which marked a new era. It was followed by "Alceste" and "Paride ed Elena." In 1774 he brought out in Paris the "Iphigénie en Aulide," which caused a controversy between the champions of the old and new schools; and, 1779, witnessed the production of his "Iphigénie en Tauride," written at the age of sixty-four, and ranked among the foremost of his compositions. His last opera, produced in Paris, was "Echo et Narcisse," 1779.

Glu'cose, a number of isomeric sugars having the composition $C_6H_{12}O_6$; in commerce in the U. S. the name given to the liquid varieties of the sugar made from cornstarch, the solid varieties being known as grape sugar. In France and Germany potato starch is the only available material for making this sugar, but in the U. S. the starch of Indian corn, or maize, is employed. The starch is first extracted from the corn in a state of sufficient purity, then transformed into sugar by treatment with dilute acid, and then neutralizing the acid, purifying, and concentrating the product. Starch sugar is used for making table sirup, for which it is mixed with molasses; as a substitute for barley malt in brewing ale and beer; as a substitute for cane sugar and adulteration in canning fruits; for adulterating honey.

Glu'coside, a substance yielding when treated with dilute acids (or certain ferments) glucose or a sugar of similar composition, and another substance not belonging to the group of carbohydrates. They occur in various plants, most frequently in the bark. Among the more important are arbutin, found in the leaves of wintergreen and of *arbutus uva ursi*; salicin, in willow bark; æsculin, in the bark of horse chestnut; amygdalin, in the oil of bitter almonds.

Glue, hard, brittle, glassy form of dried gelatin, containing impurities which give it a brownish color. It is the most important of the animal cements, and is usually obtained from the scraps of hides, the hoofs of animals, etc., by first cleansing with lime, then washing and airing so as to slake the remaining caustic lime, and then boiling in rain water, by which the albuminoid elements are changed into gelatin. Bone glue (bone gelatin) is prepared from fresh bones, either by digesting them with superheated steam, or with dilute hydrochloric acid, followed by boiling, the latter

process affording the best results. "Fish glue" is an inferior isinglass made from the offal of the fisheries. Glue is used in joinery, cabinet making, in preparing size for dressing paper, silk goods, etc., in calico printing, in making printers' rollers, in fresco painting, in paper hanging, in stiffening hat bodies, and for many other uses. See MUCILAGE; PASTE.

Glu'ten, nutritive substance obtained by kneading flour, especially wheat flour, in a stream of water, when the gluten remains behind as a sticky, adhesive mass. The flour contains two substances—vegetable myosin and an albumose—which undergo changes when mixed with water and are converted into gluten. The quantity of gluten in wheat flour varies, but in general it is present to the extent of eleven to thirteen per cent. Rye, oats, and barley flour contain very little gluten. The chief value of gluten in bread making is as a means of retaining the carbonic-acid gas and thus of facilitating the process of "raising."

Glut'ton, or **Wolverene** (wŭl-vĕr-ēn'), largest member of the weasel family, is from 3 to nearly 4 ft. long, clad in shaggy, dark-brown fur, with a much lighter band beginning just

GLUTTON OR WOLVERENE.

behind the shoulders and running along the side upward to the base of the tail. It is an inhabitant of the wooded N. portions of Europe, Asia, and N. America, and preys upon the smaller mammals, although it will attack and kill sick or wounded deer. It is savage, gluttonous, crafty, and persevering.

Glycerin (glĭs'ĕr-ĭn), sweet principle of oils, a triatomic alcohol, the base of the compounds found in animal fats and also in some vegetable substances, discovered by Scheele, 1779. It is a colorless, transparent, sweet sirup, without odor, of specific gravity 1.28; is inflammable, soluble in water and alcohol, and sparingly in ether. It may be cooled to —4° F. without freezing. Berthelot combined it with the fatty acids, and thus produced the organic fatty substances, stearine, margarine, olein, etc. Glycerin is a product of the process of saponification. It is obtained from the mother liquor of soap factories by adding a slight excess of vitriol, heating the solution with carbonate of baryta, filtering, concentrating by evaporation, and taking up the glycerin with alcohol, which is afterwards distilled off. Glycerin is formed in small quantities during the process of alcoholic fermentation. It dissolves the vegetable alkaloids and many other substances; is mixed with water to fill wet gas meters; serves as a solvent for some of the aniline colors; and is used in making nitroglycerin, and for many other purposes.

Gly'co, a sculptor of Athens (date unknown, but probably under the early Roman emperors), by whom the celebrated colossal statue of Hercules known as the Farnese Hercules was made. This was taken to Rome probably in the time of Caracalla, and placed in his baths, where it was discovered. The statue is supposed to be a copy from an original by Lysippus, and represents Hercules leaning on his club.

Glycogen (glī'kō-jĕn), a white, amorphous, starchlike, tasteless, odorless substance, found by Claude Bernard in the liver of man and the lower animals, and known to exist in other tissues, especially during fetal life. It may be dissolved by water out of the tissues where it exists, and then precipitated with alcohol. Diastase and saliva convert glycogen into maltose, a little glucose, and one of the modifications of dextrin.

Glycosuria (glī-kō-sū'rĭ-ā), a symptom of disease in which sugar is present in the urine. It is the prominent sign of the disease diabetes, but may occur in a variety of other diseases as a temporary condition, or may follow the taking of certain drugs like chloral, chloroform, and morphia. It is of frequent occurrence in the puerperal state, where its appearance indicates normality rather than disorder.

Glyp'todon, a gigantic extinct armadillolike animal. In a restricted sense the typical ge-

GLYPTODON.

nus of the family *Glyptodontidæ*, or *Hoplophoridæ*; also used as a popular name for any member of the group.

Glyptotheca (glĭp-tō-thē'kā), or **Glyp'tothek,** a modern term of which the English form is usually *glyptotheca*; a building for the reception of works of sculpture. The term Glyptothek is generally applied only to the sculpture gallery at Munich, built by King Ludwig I.

Gnat, any one of various small two-winged flies of the family *Culicidæ*, the most familiar

being the mosquito. Gnats differ from other two-winged flies (Diptera) by the long, slender mouth parts, which probe and puncture the flesh of its victim. The young are aquatic, living in pools. They are cylindrical, with the head and succeeding segments much enlarged, and breathe by means of a bunch of hairs radiating from a long tubercle at the end of the body, which connects with the internal respiratory tubes (tracheæ). They remain most of the time at the bottom of the pool, feeding upon decaying matter, and are thus beneficial scav-

1. Female. 2. Male.

GNAT.

engers. In the pupa state they take no food, and breathe by a respiratory tube, situated on the greatly enlarged thorax. The long cylindrical eggs are laid in little packets, which float on the surface of the standing water. In four weeks after hatching the insect reaches maturity. The females alone bite. No poison gland has yet been found in the head of the mosquito, the inflammation following the bite of one may be due to the irritation set up by the slightly barbed jaws, and perhaps to the slightly acrid saliva. About thirty American species of *Culex*, the genus to which the gnat belongs, are described. The buffalo gnat belongs to quite another family, the *Simuliidæ*. This minute insect is an inhabitant of the S. and SW. U. S., and becomes at times a great scourge of cattle. (See MOSQUITO.) For the gall gnat, see GALL INSECTS.

Gneisenau (gnī'zē-now), **August Wilhelm Anton** (Count Neithardt von), 1760–1831; German military officer; b. Schilda, Saxony; entered the Prussian army, 1789; in command of the fortress of Colberg, 1807, which he held against the French till the Peace of Tilsit; chief of staff and chief quartermaster to Blücher; after the Leipzig campaign was made lieutenant general; served in France, 1814; contributed much to the final success at Waterloo by his strategy after Ligny; governor of Berlin, 1818; general field marshal, 1825; led an army in Prussian Poland during the Polish insurrection of 1831.

Gneiss (nīs), a rock of granitic composition, but with a more or less pronounced parallel arrangement of its constituent minerals. As most granite shows some tendency to such a banded structure, gneiss must be regarded as the oldest, most widespread, and most fundamental of all the rocks. It is rich in metallic ores, but contains no fossils. It is a common rock in the U. S., especially in New England and New York.

Gneist (gnīst), **Rudolph von,** 1816–95; German jurist and politician; b. Berlin; professor in the university, 1844; member Prussian Chamber of Deputies, 1867–84; of the Imperial Parliament, 1875–77; instructor to Prince William in political science; author of "English Constitutional History," "Administrative Law in England," "History of the English Parliament," and numerous other historical and constitutional publications; ennobled, 1888.

Gnome (nōm), in mediæval mythology, the imaginary beings supposed to be the presiding spirits in the operations of nature in the mineral and vegetable world; have their dwelling within the earth, where they preside specially over its treasures, and are of both sexes. The males are often represented as misshapen dwarfs, of whom the well-known "Rübezahl," or "Number-nip," of German legend, is a familiar example.

Gnomic (nōm'ĭk) **Po'ets,** in Greek literature, those didactic poets whose compositions are characterized by aphorisms and short, proverb-like moral precepts (*gnomai*). Preëminent among them are Theognis, Solon the lawgiver, Phocylides and Simonides of Amorgos.

Gnostics (nōs'tĭks), "men of knowledge," adherents of numerous schools of heretics in the early Christian Church. Gnosticism came to denote a system of excessive and fanciful religious speculation. Its elements were derived from three sources: Hellenistic idealism, Oriental pantheistic naturalism, and Christian revelation. It did not begin as a heresy, but soon became such in undertaking to answer unanswerable questions. Its grand leading question was in regard to the origin of evil; but this question was only one of several. Its theme was really the whole "world-process." This process embraces the three problems of creation, sin, and redemption. The solutions offered were exceedingly diversified; the systems many and various. On four points these systems all, or nearly all, agree: (1) God is incomprehensible. (2) Matter is eternal and antagonistic to God; or, as Basilides taught, if created by God, still conditions and limits the divine efficiency. (3) Creation is the work of the Demiurge, according to some, only subordinate—according to others, totally opposed to God. (4) The human nature of Christ was a mere deceptive appearance. The most elaborate system was that of Valentinus. Gnosticism reached its highest bloom about 150 A.D. In the third century its creative energy was gone; in the fourth century it was powerless; in the sixth century only remnants of it remained. Severe laws against the Gnostics were enacted in 530 A.D. The rapidity with which the system waxed and waned is explained by the fact that it was an aristocratic heresy. The masses neither relished nor understood it. It was only a speculation of the few, and the aim was not to found sects, but schools. Only the Marcionites organized separate churches.

Gnu (nū), either of two species of S. African antelopes of the genus *Catoblepas* (or *Connochætes*). The body of the animal is stout, the legs slender, the neck bears a short, stiff

mane, and the tail is long and flowing like that of the horse. The muzzle is wide, and the horns, which are largest in the male, curve at first downward, then upward and forward.

White Gnu.

From their peculiar appearance the gnus are often termed horned horses, while the Dutch colonists christened them wildebeests on account of their savage looks and actions.

Goajira (gō-ä-hē'rä), peninsula of the N. coast of S. America; forming the W. side of the Gulf of Maracaibo, and crossed by the boundary between Venezuela and Colombia; contains about 5,800 sq. m., and is connected with the mainland by an isthmus 37 m. wide; belongs chiefly to Colombia.

Goat, popular name for the ruminant mammals of the genus *Capra*, of which the domestic goat is a familiar example. Although the domesticated goat has been introduced into all countries, goats are found wild only in the Old World. The so-called Rocky Mountain goat is an antelope. The origin of the domestic goat is uncertain, but while some consider the original species as extinct, there is reason to suppose that it may be the wild goat of central Asia. The male of this species is characterized by horns, which sometimes attain a length of 3 ft. As a result of long domestication, varied surroundings, and crossing, the domestic goat has developed into marked breeds, among which are the noted Angora and Kashmir goats. The former, which derives its name from Angora in Asia Minor, has slightly twisted horns and very long, curly, silky hair; there is a shorter and inferior under coat. The Kashmir goat is very similar to the Angora, but is of more delicate build, while it is the under coat of hair that is most prized. Of this are made the valuable Kashmir, or "camel's-hair," shawls. The flesh of goats is rather dry, and is inferior to mutton, but the hides make good leather and furnish a part of the kid gloves of commerce. The milk of the goat is sweet and nutritious.

Goat Is'land, island which divides the current of the Niagara River at the Falls; belongs to Niagara township, Niagara Co., N. Y.; area, 70 acres; is 900 ft. distant from the mainland of the U. S. and 2,000 from the Canadian shore; is connected with the New York shore by a substantial bridge.

Goat'sucker, a bird (*Caprimulgus europæus*) of the Old World, belonging to the order *Picariæ* or *Macrochires*, the type of the family *Caprimulgidæ*, to which belong the whip-poor-will, the chuck-will's-widow, the night hawk, and several other birds of the U. S., all of which are collectively called goatsuckers. The true goatsucker gets his name from the ancient belief that he sucks the milk of goats and cows, infecting the animals with a deadly disease. The bird is also called fern owl, dor-hawk, nightjar, etc.

Gobelin (gōb'ē-lĭn) **Tap'estry,** a kind of tapestry made only in the Gobelins factory, in the Faubourg St. Marcel, Paris. Some Gobelin tapestries cost from $30,000 to $40,000, and require from five to ten years for completion. Since 1791 none have been sold. They are mostly presented by the French Govt. to foreign courts. The first Gobelin factory was built by a Belgian wood-dyer of the fifteenth century, one Jehar Gobeelen.

Gobi (gō'bē) an immense desert tract in central Asia, occupying mainly the table-land between the Altai Mountains on the N. and the Kuenlun on the S.; about 1,800 m. long, with an average breadth of nearly 350 m.; area, about 600,000 sq. m. The W. part, drained by the Yarkand, which falls into Lake Lob, and having many salt lakes, is in E. Turkestan; the E., better known, and having a few fertile valleys and some towns, is chiefly in Mongolia, but a small part is in the Chinese province of Kansu. A large portion, called by the Chinese Shamo, or the Sand Sea, is a plain 2,500 to 3,000 ft. above the sea.

Goby (gō'bĭ), spiny-rayed fish, of the genus *Gobius*, found on the rocky and sandy coasts of the Old World. The black goby (*G. niger*), the largest on the British coasts, is about 6 in. long; has two dorsal fins; and the ventrals

Goby.

are united below the throat into a sucking disk by which it can attach itself to the rocks, to which it retires to devour its living prey. Gobies, like the allied blennies, are very tenacious of life, and will live a considerable time out of water. The males of several species guard the eggs in nests of seaweed till they are hatched.

God, the Supreme, Absolute Being, the Creator of the universe, the infinite, eternal and unchangeable Spirit. Under Christian ideas the word designates a self-existent and absolutely perfect, free, personal Spirit, distinct from and sovereign over the world He has

created. The four principal proofs of God's existence are: (1) The *ontological argument*: that the idea of an infinitely Perfect Being could not have originated in a finite source, and therefore must have been communicated by an infinitely Perfect Being. (2) The *cosmological argument*: Every new thing and every change in a previously existing thing must have a cause sufficient and preëxisting. The universe consists of a system of changes. Therefore, the universe must have a cause exterior and anterior to itself. (3) The *teleological argument*, or argument from design or final causes: Design, or the adaptation of means to effect or end, implies the exercise of intelligence and free choice. The universe is full of traces of design. Therefore, the "First Cause" must have been a Personal Spirit. (4) The *moral argument* derived from the constitution and history of man and his relations to the universe is founded upon the phenomena of consciousness, of conscience, upon the history of the human race, and especially upon the Christian Scriptures.

The attributes of God include (1) Monotheism: (*a*) there can be but one necessarily existent Being, and but one infinite and absolute of the same order; (*b*) the unity of the cosmos proves the unity of presiding intelligence; (*c*) our moral consciousness testifies that the source of all moral authority must be single and unique. (2) God is an infinite and absolute Being. The conception of God in terms of human nature is right and necessary when limited to the application to God in an infinite degree of the spiritual excellences of man. But it is used in a bad sense when we attribute to God any likeness of our bodily parts or passions, or conceive of Him as subject to our imperfections or limitations. (3) God is an absolute, perfect, personal Spirit. (4) He is eternal. (5) Absolutely, God is infinite in His immensity, transcending all the limits of space; relatively, He is omnipresent in His essence, as well as His knowledge and power to all His creatures. (6) He is immutable as to His essence, His perfections, and His will. (7) His knowledge has no limits. He knows Himself and all things possible by the light of His pure reason. He knows all things actually existent, whether past, present, or future, in the light of purpose. He knows all things in their essential being, and in all their relations, by one all-comprehensive, timeless intuition. (8) He is omnipotent—that is, the causal efficiency of His will has no limit other than His own perfections. (9) The goodness of God, existing in the forms (*a*) of benevolence to all sentient creatures, (*b*) love to persons, (*c*) mercy to the miserable, and (*d*) grace to the ill-deserving, has no limit outside of His own perfections. (10) God is absolutely true—*i.e.*, self-consistent and reliable. (11) He is absolutely righteous. This involves (*a*) holiness, or absolute subjective moral perfection; (*b*) justice, when He is regarded as standing to His intelligent creatures in the relation of moral governor. (12) God's will is the organ of His infinite perfections. It is free, in the sense of being a rational spontaneity. It is sovereign, inasmuch as it is conditioned upon nothing save His own all-perfect nature.

Various Prevalent Antitheistic Theories.—*Atheism* signifies the denial of the being of God. "Atheism" now stands for the denial of the existence of a personal Creator and Moral Governor. *Dualism* is used in two senses, which must be discriminated. As the opposite of Monism in philosophy, it is the doctrine that there are two generically distinct essences, matter and spirit, in the universe; in this sense the common doctrine of Christendom is dualistic. Dualistic tendencies in modern times assume a very subtle form, speaking of "the nothing" out of which things are created as exerting a dull and inert opposition to creative force. *Polytheism* distributes the perfections and functions of the infinite God among many limited gods. Among the rudest savages it sank to fetishism. Among the Greeks it was made the vehicle for the expression of their refined humanitarianism in the apotheosis of heroic men. *Deism*, although etymologically synonymous with theism, has been distinguished from it since the middle of the sixteenth century, and used to designate a system admitting the existence of a personal Creator, but denying His controlling presence in the world, His immediate moral government, and all supernatural intervention and revelation. *Pantheism* is absolute monism, maintaining that the entire phenomenal universe is the ever-changing existence-form of the one single universal substance, which is God. Thus God is all, and all is God. God is absolute being, of which every finite thing is a differentiated and transient form. It is obvious that pantheism in all its forms must either deny the moral personality of God or that of man, or both. The most ancient, consistent, and prevalent pantheism of the world's history is that of India. As a religion it has molded the character, customs, and mythologies of that people for four thousand years. See ATHEISM; DEISM; JEHOVAH; PANTHEISM; POLYTHEISM; RELIGION; THEOLOGY.

Godavari (gō-dä'vär-ē), largest river of the Deccan; rises from the W. Ghats, within 50 m. from the Arabian Sea, and crosses the Deccan in a SE. course of about 900 m. After passing through the E. Ghats it separates into several arms, forms a delta, and falls into the Bay of Bengal. It is navigable for some distance above its passage through the E. Ghats.

Goderich (gōd'rĭch), **Viscount.** See RIPON, GEORGE FREDERICK SAMUEL ROBINSON, MARQUIS OF.

God'father, God'mother. See SPONSORS.

Godfrey (gŏd'frĭ) **of Bouillon** (bō-yōn'), 1061–1100; King of Jerusalem and sixth Duke Godfrey of Brabant, or the Lower Lorraine; b. Nivelle, Lorraine; Governor of Bouillon (now included in the Belgian province of Luxembourg), 1076; fought with valor in Germany and Italy on behalf of Henry IV against the pope; took the cross for the Holy Land, 1095, to expiate his sin of fighting against the pope (first crusade); furnished 80,000 infantry and 10,000 cavalry; captured Nicæa, 1096; defeat-

ed Soliman at Dorylæum, 1097; took Antioch, 1098, and Jerusalem, July 15, 1099; declared King of Jerusalem, but declined to wear a crown of gold where his Lord had worn a crown of thorns, and refused the title of king, preferring that of Defender and Baron of the Holy Sepulcher; defeated the Egyptians at Ascalon; conquered Galilee; promulgated the "Assizes of Jerusalem," a system of feudal law; died at Jerusalem, and was succeeded by Baldwin I.

Godfrey of Strassburg (străs'bŏrkh). See GOTTFRIED OF STRASSBURG.

Godi'va, La'dy, wife of Leofric, Earl of Mercia and Master of Coventry in England, who abt. 1040 imposed on that town heavy exactions, of which the people complained. Lady Godiva entreated her lord to spare the town, and he consented on condition that she should ride naked by daylight through Coventry, to which proposal she agreed. The people kept within their houses and did not look out, excepting one tailor or baker, the Peeping Tom of Coventry; but he was at once struck blind, and, according to one version, was soon afterwards hanged by the earl. A pageant in Godiva's honor is still celebrated at Coventry.

God'kin, Edwin Lawrence, 1831–1902; American journalist; b. Moyne, Ireland; war correspondent in Turkey and the Crimea for the London *Daily News*, 1854–56; traveled in the U. S. as a correspondent of the same journal; admitted to the New York bar, 1858; corresponded with *The Daily News* and the New York *Times* during the Civil War; editor of *The Nation*, 1865, and its proprietor, 1866. In 1881 *The Nation* was made the weekly issue of *The Evening Post*, and Mr. Godkin became one of the editors and proprietors of the joint publication.

Godoy (gō-dō'ē), **Manuel de,** 1767–1851; Spanish statesman; Duke of Alcudia, Albufera, and Soto-Roma, and Prince of the Peace; b. Badajoz; major and adjutant general and Knight Grand Cross of Charles III, 1792; in 1795, was made a grandee of the first rank, having been (1792) first secretary of state and (1793) captain general. His Treaty of Basel (1796) won him the title "Prince of the Peace." In 1798, grand major-domo; 1799, grand admiral; 1801, reassumed the power which the popular will had forced him to abdicate, and soon after, by the Treaty of Badajoz, agreed to divide Portugal between France and Spain, for which service he received a large sum from France. He assisted Napoleon in gaining possession of Spain, and Napoleon in turn released him (1808) from the prison into which the nobles and people had thrown him.

God Save the King! (*Domine salvum fac Regem!*) a formula repeated on occasions of solemnity and appended to state proclamations in Great Britain. The same words give name to a well-known British national air, the authorship of which was long ascribed to Dr. John Bull (1563–1622). The authorship of both words and music of this piece, nearly as it now stands, is generally assigned to Henry Cary, who died 1743. In the U. S., "My Country, 'Tis of Thee" is sung to the same tune.

Godthaab (gŏt'hăb), or **Godhavn** (gŏd'hown), first Danish colony in Greenland; established, 1721, by Hans Egede on Disco Island, Davis's Strait. The seat of the Inspectorate of Greenland. Pop. (1901) 294.

God'win, earl of the W. Saxons in England; d. 1053; stood high in the favor of King Canute, but abandoned the Danish cause and placed Edward the Confessor on the throne, 1042; chief administrator of the government; gave his daughter Editha to the king in marriage, but quarreled with the latter and was obliged to leave the country, 1051. The Witenagemot, however, restored Godwin to his home, 1052.

Godwin, Mary Wollstonecraft, 1759–1797; English author; b. Hoxton, near London; daughter of Edward John Wollstonecraft; started at Islington, 1783, a day school on a more national system of education than was then accepted; published "Thoughts on the Education of Daughters," and, 1792, the famous "Vindication of the Rights of Woman," a presentation of woman suffrage; lived in Paris, 1792–95, and wrote "Moral and Historical View of the French Revolution"; married Gilbert Imlay, a native of New Jersey, who deserted her; returned to England, and, her former marriage being invalid according to English law, married, 1797, William Godwin, the novelist and political writer, but died the same year, giving birth to a daughter, the future Mrs. Shelley.

Godwin, Parke, 1816–1904; American journalist; b. Paterson, N. J.; 1837, contributed to the New York *Evening Post*, edited by his father-in-law, William Cullen Bryant; 1843, edited *The Pathfinder* for three months; then returned to the *Evening Post*, of which he was for many years managing editor; one of the editors of *Putnam's Monthly Magazine*; published "A Popular View of the Doctrines of Charles Fourier," "Democracy, Pacific and Constructive," "Political Essays," "Out of the Past," the first volume of a "History of France," and "Vala, a Mythological Tale," founded on incidents in the life of Jenny Lind; translated a part of Goethe's autobiography and a volume of Zschokke's tales; and compiled a "Cyclopædia of Biography."

Godwin, William, 1756–1836; English political writer and novelist; b. Wisbeach, Cambridge; a Dissenting minister at Ware, Stowmarket, and Beaconsfield, 1778–83; for a time a bookseller in London, and after 1833, yeoman-usher of the Exchequer; married Mary Wollstonecraft, 1797; wrote many works, including "Political Justice," 1793; "History of the Commonwealth," "On Population" (against Malthus), "Genius of Christianity," "Caleb Williams," a powerful novel, 1794; political pamphlets, tragedies, works for the young, etc.

God'wit, popular name for various wading birds, having long bills, like those of snipes; mostly of genus *Limosa*. The great marbled

MARBLED GODWIT.

godwit and Hudsonian godwit (*L. fedoa* and *Hudsonica*) are N. American species; the telltale godwit is the *Gambetta melanoleuca* of the U. S.

Goes (gōs), **Hugo van der,** d. abt. 1482; Flemish painter; pupil and successor of Van Eyck; works, all of religious subjects, include a "Crucifixion" in the Church of St. James, Bruges, and a "Nativity" at Florence.

Goes, Jan Antonioz, or **Joannes Antonides, van der,** 1647–84; Dutch poet; b. Goes; the last considerable representative of the golden age of Dutch letters; published tragedies, including "Trazil of overrompeld Sina," and poems, including "Bellone aen Bant," and "De Ystroom."

Goethe (gö'tė), **Johann Wolfgang von,** 1749–1832; the greatest modern poet of Germany, and the patriarch of German literature; was born at Frankfort on the Main. His father was doctor of law and imperial councilor; in good circumstances, possessing a taste for the fine arts. Drawing, music, natural science, the elements of jurisprudence, and the languages, occupied his early years; and when he was fifteen, he was sent to the Univ. of Leipzig, but did not follow any regular course of studies. In 1768 he quitted Leipzig, and subsequently went to the Univ. of Strassburg, to qualify himself for the law; but he paid more attention to chemistry and anatomy than to the law. In 1771 he took the degree of doctor, and then went to Wetzlar, where he found, in his own love for a betrothed lady, and in the sucide of a young man named Jerusalem, the subjects for his "Sorrows of Werther," which appeared in 1774, and at once excited the attention of his countrymen. Having in 1779 entered the service of the Duke of Saxe-Weimar, whom he had met in traveling, he was made President of the Council Chamber, ennobled, and loaded with honors. A splendid galaxy of distinguished men assembled around Goethe at Weimar. The direction of the theater was confided to him, and he there brought out some of the dramas of Schiller, with an effect worthy of them. There, too, his own dramatic works first appeared, *viz.*, "Goetz von Berlichingen," "Faust," "Iphigenia in Tauris," "Tasso," "Clavigo," "Stella," and "Count Egmont." In 1786 he made a journey to Italy, where he spent two years, visited Sicily, and remained a long time in Rome. In 1792 he followed his prince during the campaign against France in Champagne. He was afterwards appointed minister; received, in 1807, the order of Alexander-Newsky from Alexander of Russia, and the grand cross of the Legion of Honor from Napoleon. Goethe was an intellectual giant, and represents in himself alone, says Madame de Staël, the whole of German literature. His keen and profound insight to human life and character, his encyclopedic knowledge, his sublime imagination, his exquisite sensibility and play of fancy, and his consummate style, place him in the highest circle of intellectual and literary glory. His mighty influence has reached all spheres of human thought, and grows with time. Admiration of this poet forms a sort of masonic password, uniting men of all countries. "Faust" is his greatest poem—perhaps his greatest work. Its subject is the life of man in the world: the aspiration, the resistance, the temptation, the sin, the agony, the failure; mysterious and very mournful; furnishing matter for comment and controversy, for admiration and blame, for many a year yet. The greatest prose work of Goethe is "Wilhelm Meister's Apprenticeship," well known through Carlyle's admirable translation. His beautiful songs and shorter poems, elegies, etc., are all tinged with the profound reflections of his philosophical mind, and continually touch the deep springs whence flow our griefs and joys, our fears and hopes, and all the emotions of the soul. Goethe's writings are by far too voluminous to be here enumerated, occupying about forty volumes. Besides those already named, may be mentioned the charming idyllic poem "Hermann and Dorothea"; the fascinating memoirs of his own life, entitled "Poetry and Truth: Out of My Life"; "Elective Affinities"; "Metamorphosis of Plants."

Goetz (göts), **Hermann,** 1840–76; German opera composer; b. Königsberg, Prussia; composed his first opera, "The Taming of the Shrew," in his twenty-third year. It was produced with great success at Mannheim, 1874. He also composed "Francesca da Rimini," but he did not live to see it performed. He died, leaving this and other works, including a psalm, a cantata, "Nænia," and other works in MS.

Goffe (gŏf), **William,** abt. 1605–79; English regicide; b. Sussex; major general in the Parliamentary army; sat in Parliament, and was spoken of with favor as the successor to the Protectorate; one of the judges who signed the death warrant of Charles I; on the news of Charles's return, 1660, fled with his father-in-law, Edward Wholley; lived in Cambridge, Mass., 1660–61; hunted by crown officers, took refuge in Connecticut; lived in secrecy in New Haven and other towns; removed to Hadley,

Mass., 1664; according to a discredited tradition, saved the town from destruction by the Indians, 1675; removed to Hartford, Conn., 1679.

Gog and Ma'gog, names occurring several times in the Bible. In the Mosaic Table of Nations (Gen. x, 2), Magog is the second of the seven sons of Japhet, representing a people, probably the Scythians. In Ezekiel (xxxviii, 2 and xxxix, 1) Gog is the prince of the people Magog. In Rev. (xx, 8) both Gog and Magog are peoples, opposing, as in Ezekiel, the people of God, and doomed to destruction. —Gog and Magog are also the names of two images of giants standing in the Guildhall, London, made, 1708, by Richard Saunders, replacing two which were burned in the Great Fire. The original images are mentioned as early as 1415, and probably were much older. Many European towns have, or have had, their old corporation giants.

Go'gol, Nikolai Vasilievitch, 1809–52; Russian author; b. in the government of Poltava; held a government clerkship in St. Petersburg for a time; Adjunct Prof. of History at the university there, 1834–36; lived in Italy, chiefly at Rome, 1842–48; became a partisan of absolutism and a mystical ascetic; returned to Russia abt. 1848, and died in Moscow; works include "Evenings on a Farm," stories and sketches, 1831; "Mirgorod," a supplementary volume; "The Revizor," a comedy, holding up to contempt the corruption of Russian officialism; "Taras Bulba, a Tale of the Cossacks"; "Chicagov," or "Dead Souls," 1842, a novel, considered his masterpiece.

Gog'ra, or **Ghog'ra,** river of Hindustan; one of the largest affluents of the Ganges; rises at an elevation of 17,000 to 18,000 ft. in the glaciers of the Himalayas; enters the plains of Hindustan, and joins the Ganges, 150 m. below Benares, after a course of about 600 m. After its descent into the plains it is navigable for large boats in all seasons, though its navigation is somewhat difficult on account of shoals.

Goiter (goi'tẽr), **Bronchocele** (brŏn'kō-sēl), **Thyreocele** (thī'rē-ō-sēl), or **Derbyshire** (dẽr'bī-shīr) **Neck,** enlargement of the thyroid gland which lies across the front of the windpipe. It may be due to overgrowth of the gland, to enlargement of blood vessels, to the formation of cysts, etc. Goiter prevails in the deep valleys of mountainous regions, as in the Alps and the Himalayas, and in the chalky regions of England. In some districts of Switzerland eighty per cent of the recruits have been found to be goitrous. Drinking the water of certain wells on the Continent of Europe produces goiter, and it is intentionally and successfully taken by men who wish to escape military service. Except for a sense of fullness about the throat mild goiter may cause only slight symptoms, but great enlargement leads to dangerous pressure on the structures of the neck, and causes difficulty in breathing and swallowing. Sudden death occasionally occurs in goitrous subjects. The treatment of goiter includes abstinence from the local drinking water unless it is boiled, the taking of thyroid extract, and painting the neck with iodine. The gland may have to be cut. Some goitres —especially those due to feminine affections— may disappear without any treatment.

Golcon'da, fortress and decayed town; 7 m. W. of Hyderabad, British India; long famous for its diamonds, which, however, were only cut and polished here; and it was the treasury of the Nizam, and as such fortified and jealously guarded. In its neighborhood are the mausolea of its former sovereigns, stupendous buildings of granite, with roofs of porcelain tiles of brilliant blue.

Tombs of the Kings, Golconda.

Gold, one of the heaviest, softest, and the most malleable metals; is widely distributed, being found in the metallic state in nearly all of the mountain chains of the globe, and in solution in minute quantity in sea water. It was probably the earliest known metal; has been prized through all ages for its beauty and indestructibility. It is rarely found pure, it being alloyed with silver. The silver ranges from 0.16 to sixteen per cent of the native metal. California gold averages eighty-eight per cent of pure gold and twelve per cent of silver. Australian gold contains on an average 92.5 of gold and 7.5 of silver. The proper solvent of gold is chlorine, and fluids contain-

ing free chlorine or evolving chlorine will dissolve it. The mixture of the two acids, nitric and hydrochloric, known as aqua regia, is commonly employed. Gold fuses at a temperature of 2,016°. It may be volatilized by solar heat concentrated by a glass, or by the oxyhydrogen jet, and rises in purple vapors. In solidifying from fusion it contracts greatly. The presence of $\frac{1}{2000}$ part of lead, bismuth, or antimony destroys the ductility of gold. It is also made brittle by sudden cooling. Its tenacity is next to that of silver. Atomic weight, 196.71.

As regards the nature of the rock formations in which gold is found, it may be said, in general, that it occurs in formations of nearly all geological periods, from the earliest rocks to the latest Tertiary. It is chiefly, however, in the uplifted and partially altered slates and shales of the Middle Secondary and the Paleozoic periods that the great deposits occur. Quartz is the almost universal veinstone, but the metal also occurs in granite, syenite, limestone, and sandstone. Very large irregular masses are sometimes taken from veins, but they are more common in placer deposits, and are generally known as *nuggets*. The famous Blanch Barkly nugget in Australia weighed 146 lbs., and one from Ballarat weighed 184 lbs. 8 oz., and was worth over $41,000. A mass weighing about 160 lbs., consisting partly of quartz, was reported in the early days of California mining as having been taken from the quartz vein on Carson Hill. Gold mines may be grouped: (1) vein mines and (2) placer mines. Gold-bearing veins are generally of quartz, and penetrate solid rocks. Placer mines are the comparatively superficial detrital deposits formed by the action of rivers and floods. In veins the gold is firmly fixed in the gangue or veinstone, and is in irregular, ragged masses or crystalline particles; but in placers the gold is detached from the gangue, and is worn and rounded by attrition, having been rolled and tumbled in the beds of creeks and torrents together with pebbles and boulders until all the asperities have been removed. Placer gold can thus be easily distinguished from vein gold. In 1493 the world's production of gold amounted to 5,221,160 fine ounces, value $107,931,000; in 1907 the product was 19,860,620 fine ounces, value $410,555,300. In 1907 Africa was the largest producer, having produced 7,338,468 fine ounces, with value of $151,699,600; the U. S. produced the next largest amount, 4,374,827 ounces, with value of $90,435,700, and Australia next, with 3,660,911 ounces, valued at $75,677,700. The value of coinage in the mints of the world in 1907 was $7,684,448,923; in the U. S. mints, $131,638,632. Estimates of the world's consumption of gold, in arts and industries in 1907, was $135,046,500; in U. S., $33,549,500. In the U. S., Colorado produced, in 1907, gold to the value of $20,897,600; Alaska, $18,489,400; California, $16,853,500; and Nevada, $15,411,000. See DUTCH GOLD.

Gold Beat'ing, process of hammering gold into thin leaves. Gold leaf was made by the Egyptians and other ancient nations, probably by means similar to those now in use. According to the earliest records, it was first hammered between parchment leaves. The invention of gold-beaters' skin (at an unknown date), which is made by agglutinating the mucous surfaces of the cæcum of the ox and beating under the action of alum, isinglass, and creosote, was the means of bringing the operation to its present state of perfection. The gold is made into ingots, which are annealed in hot ashes, beaten with a hammer to thin plates, and rolled between steel rollers to about $\frac{1}{800}$ of an inch in thickness, repeated annealing being performed during the process. The ribbons so made (about 10 ft. by $1\frac{1}{2}$ in.) are cut into squares weighing each about 6 grains, and beaten between calfskin vellum or tough paper, placed in a parchment case. About 150 of these leaves are beaten at once with a 16-lb. hammer, having a slightly convex face, on a marble block. In about twenty minutes the leaves are spread to a size about 4 in. square. They are then cut into four pieces each, and placed in gold-beater's skin, 600 leaves being placed in one pack, enclosed in parchment cases, and beaten with a smaller hammer for about two hours, which again quadruples their surface. They are again quadrupled in number (2,400), and again beaten for about four hours, which reduces them to $\frac{1}{9000}$ of an inch. The operation has been continued until the leaf was $\frac{1}{361000}$ of an inch thick.

Enormous quantities of gold are consumed annually in the arts; the consumption for gilding alone is very large; for, although the films are exceedingly thin, they are spread upon a variety of manufactures, such as frames, furniture, signs, pottery, jewelry, books, etc., to a far greater extent than is generally supposed. The malleability of the ordinary leaf is not, however, sufficiently perfect for the purposes of dentistry. Dentists' foil is accordingly annealed by floating the leaf for an instant over the flame of an alcohol lamp. A gas flame will not answer, as it lessens rather than heightens the malleability of the leaf, probably by depositing a film of sulphur over it.

Gold Coast, The, British colony in W. Africa, stretching along the Gulf of Guinea 350 m., and inland to Ashanti, over which a protectorate was extended, 1896; area of colony Ashanti and protectorate about 82,000 sq. m.; pop. (1901) 1,486,433. The native population contains numerous tribes, belonging to two distinct subraces—the black and the reddish. The Fantis and Ashantis represent the former, and the Acra and Crobo the latter. Mohammedanism and Christianity are both actively working in missionary efforts in this part of Africa. The Gold Coast owes its name to the former abundance of gold on this coast. It is now produced in small quantities only, though the whole region is auriferous. The country is covered with vast forests of large trees. The chief products are palm oil and kernels, and the export of caoutchouc and woods is increasing. The principal towns are

Cape Coast Castle, pop. (1901) 28,948; Acra, 14,842; and Elmina, 3,973.

Gold'en Age, in the traditions of many nations, the supposed period of primeval happiness and innocence from which mankind has departed. The ancients referred this time to the reign of Saturn. A favorite dream of some modern reformers is that the golden age is in the future instead of in the past. The term is now used to denote the culminating or most brilliant epoch of any period of history or the like. The "golden age" of Roman literature is reckoned from the time of Livius Andronicus, abt. 250 B.C., to Augustus Cæsar's death, A.D. 14. Plautus, Terence, Lucretius, Catullus, Cæsar, Cicero, Sallust, Propertius, Vergil, Tibullus, Livy, Ovid, and Horace are the principal writers of the golden age.

Golden Calf, golden image formed for idolatrous worship by the Israelites at Mt. Sinai (Ex. xxxii). Probably a wooden figure covered with gold, and a representation of the Egyptian god Mnevis or Apis. It was destroyed by Moses. In later times golden calves were set up by King Jeroboam at Bethel and Dan, where they became favorite objects of popular worship.

Golden Chersonese (kêr'sō-nēs), Greek name for the modern peninsula of Malacca.

Golden-crowned Thrush. See OVEN BIRD.

Golden Ea'gle, large and handsome bird of prey (*Aquila chrysaëtos*) common to Europe, Asia, and N. America; named from the golden-brown color of the head and upper neck of the adult bird. The rest of the plumage is dark

GOLDEN EAGLE.

brown. The American bird is slightly larger than the Europen-Asiatic form, and is accorded the rank of a subspecies under the title *Aquila chrysaëtos canadensis*; is 3 to 3½ ft. in length, and 6 or 7 ft. in spread of wing. See EAGLE.

Golden Fleece, in Greek mythology, the golden wool produced by the ram Chrysomallus. The fleece was suspended in an oak tree in the grove of Ares in Colchis, and guarded by a dragon. When the Argonautæ (*q.v.*) came to Colchis for the fleece, being sent thither by Pelias, Medea put the dragon to sleep and Jason carried the fleece away.

Golden Fleece, Or'der of the, order of knighthood, the oldest, most exclusive, and most illustrious in Europe; founded at Bruges, 1429, by Philip III of Burgundy, on the occasion of his marriage with the Portuguese princess Isabella, and was consecrated to the Virgin Mary and the apostle St. Andrew, with a reference to Philip's father, who had been a prisoner at Cachis. Charles VI, Emperor of Germany, as possessor of the Netherlands, transferred the seat of the order to Vienna, as the Spanish monarchs had already done to Madrid. Thus there arose two branches, a Spanish and an Austrian, the latter having the original archives, but the former being the more exclusive.

Golden Gate, popular name of the entrance to the Bay of San Francisco, a channel 2 m. wide; defended by Fort Point and works on Alcatraz Island, within the entrance.

Golden Horde, band of Tartars who appeared at Khipsali, 1235; 1240, invaded Russia and burned Moscow and Kiev; destroyed Lublin and Cracow, 1240; burned Breslau, 1241; and defeated Henry, Duke of Silesia, at Liegnitz; ravaged Moravia and Hungary, and massacred the Magyar army, 1241. A crusade was preached against them, 1241; their siege of Neustadt was unsuccessful; they crossed to the S. of the Danube, 1242; established in Russia an empire which lasted until Ivan III (1462–1505); captured Bagdad, the seat of the Abassid caliphate, holding the city till the beginning of the fifteenth century, when they were conquered by Tamerlane. Their first leader, Batou, was a grandson of Genghis Khan, and their invasion was ordered by Octai, the great khan.

Golden Horn, term applied to the harbor of Constantinople, because of its shape and beauty.

Golden Num'ber, number of the year in the Metonic cycle, otherwise called the lunar cycle. As the times of holding the Grecian games were dependent on the state of the moon, this number was of prominent importance in the Grecian calendar; and hence is said by some to have been inscribed in characters of gold on the columns of the Temple of Minerva at Athens, whence its name. Others say that it was thus called because it was written in gold in the calendar tables publicly suspended in the Grecian cities; and later in the portable calendars in use among the early Christians. The golden number is useful only in finding the day on which Easter (and thence the other movable feasts of the Church) will fall. The cycle begins with the year in which the new moon falls on January 1st. To find the number of any year in the lunar cycle, or the golden number of that year, we have this rule: add one to the date and divide by nineteen; the quotient is the number of cycles elapsed, and the remainder is the year of the cycle.

Should there be no remainder, the proposed year is the last or nineteenth of the cycle.

Golden Purse, ancient province of Andalusia, Spain; so called because of the great wealth derived therefrom.

Golden Rob'in. See BALTIMORE ORIOLE.

Golden-rod, popular name originally belonging to the *Solidago virga aurea*, an extremely variable plant of N. America and Europe, once in repute for its supposed power to heal wounds. In the U. S. the name is extended

GOLDEN ROD.

to the numerous herbs of the same genus (family *Compositæ*) which are mostly tall, stiff annuals with yellow flowers. They are chiefly American. One species, the *S. odora*, is often fragrant, abounding in a volatile oil. It has a limited use in medicine, being carminative, aromatic, and diaphoretic.

Golden Rose, rose made of gold and set with precious stones, blessed by the pope annually on the fourth Sunday in Lent, and then presented to some prince or other dignitary, or, if no one is deemed worthy to receive it, laid up in the Vatican. The custom seems to be very old, but to have developed gradually. Gregory the Great used to send filings of the chains of St. Peter set in gold keys or gold crosses to persons as friendly gifts.

Golden Seal, a ranunculaceous plant of the U. S., belonging to the genus *Hydrastis canadensis*, common in many parts, and known as puccoon, or yellow root. It is used to a considerable extent in medicine, and has the power of dyeing a rich and permanent yellow. Its valuable tonic powers depend in part on the presence of berberine and hydrastine. Much difficulty is sometimes experienced in obtaining pure hydrastine, as it often is supplanted in commerce by hydrastine, a substance containing berberine and a resin.

Gold'finch, favorite European song bird (*Carduelis elegans*), prettily colored with yellow, white, black, and a little red; is readily domesticated, sings fairly well, and breeds freely with the linnet and canary, the hybrids being prized for their song. It ranges over Europe and N. Africa, extending E. to Persia. The American goldfinch is a distinct bird (*Spinus*

GOLDFINCH.

tristis), and much more "golden" than its namesake, the breeding plumage of the male being bright yellow, wings, tail, and top of head black, with some white markings. See PINE FINCH.

Gold'fish, *Carassius auratus*, or golden carp, a Chinese fish naturalized in many streams and lakes of Europe and the U. S. From its

GOLDFISH.

beautiful orange color and its tenacity of life it is often kept in glass globes and aquaria. A great number of varieties and monstrosities are common in domestication.

Gold Flux. See AVENTURINE GLASS.

Gold Leaf. See GOLD BEATING.

Gold of Pleas'ure, or **False Flax,** *Camelina sativa*, an annual herb of the family *Cruciferæ*; grows in Europe and Asia, and has been naturalized in the U. S., where it is a worthless weed; but in some parts of Europe it is cultivated for the oil obtained from its seed.

Goldoni (gōl-dō'nē), **Carlo,** 1707–93; father of the modern Italian comedy; b. Venice; went to Paris to write for the Italian theater in that city, 1761; teacher of Italian to the three daughters of Louis XV, and received a pension of 4,000 fr. yearly, which was taken from him at the outbreak of the Revolution, but restored to him by the efforts of André Chenier. He wrote about 200 comedies, of which a few are written in French; the rest in Italian, often in the Venetian dialect. His last literary labor was writing his memoirs (1787), which are said by Gibbon to be more comical than his best comedies. The most striking characteristic of Goldoni is his fertility, scarce-

ly surpassed by that of Calderon and Lope de Vega. There are editions of his works in fifty-three, forty-four, and twenty-six volumes.

Gold Pur'ple, pigment known as the precipitate of Cassius, and described by Andreas Cassius and his son, 1685; used chiefly for giving a pink or violet color to glass and enamels. It is formed by adding a dilute mixture of protochloride and perchloride of tin, drop by drop, to a dilute neutral solution of terchloride of gold; a purple precipitate is formed.

Golds'borough, Louis Malesherbes, 1805–77; American naval officer; b. Washington, D. C.; became lieutenant in 1825 and commander in 1841; took part in the Mexican War; superintendent of the Naval Academy, 1853–57; commanded the naval part of Burnside's expedition to N. Carolina, 1861; made rear admiral, 1862, and commanded the European squadron, 1865–67, and later the Washington navy yard.

Goldschmidt (gölt'schmit), **Hermann,** 1802–66; German astronomer; b. of Jewish parents at Frankfort; studied painting under Cornelius, and practiced that art with some success at Paris, 1836–47; then devoted himself to astronomy; discovered (1852–61) fourteen asteroids; also detected thousands of stars not before given on the best atlases; and announced the discovery of six new companion stars revolving around Sirius, for which the Academy of Sciences bestowed on him its grand astronomical prize.

Goldschmidt, Jenny Lind. See LIND, JENNY.

Goldschmidt, Meyer Aaron, 1819–87; Danish novelist; b. Vordingborg, Seeland; founded a weekly journal, *The Corsair*, 1840, which made a great sensation in Copenhagen by its brilliant wit and audacious satire; founded another weekly paper, *North and South*, 1840, which was well patronized on account of its criticisms, generally sound and always fine and elegant. It was as a novelist that he became dear to his countrymen. His style has sparkling wit and pathetic power, but its highest excellence is its wonderful simplicity. Some of his novels are well known to English readers—"A Jew," "The Homeless One," "The Heir," and "The Raven."

Goldschmidt, Otto, 1829–90; German composer and conductor; b. Hamburg; married Jenny Lind at Boston, Mass., 1852; in 1855 made his home in England; composed an oratorio, "Ruth," for the Hereford festival of 1867, founded the Bach choir, 1875, and conducted it till his death; also conducted many festivals in Germany and composed much good music.

Gold'smith, Oliver, 1728–74; British author; b. Pallas, Co. Longford, Ireland; son of a poor Anglican minister; graduated at Trinity College, Dublin; was a rejected applicant for holy orders; tried the study of law, but, having wasted his scanty means in gaming, spent eighteen months as a medical student in Edinburgh, out of which town he was hunted by creditors; lived abroad, 1754–56, chiefly at Leyden, and afterwards wandered over a large part of France, Germany, and Italy, taking his medical degree probably at Padua, and supporting himself by his musical talents, which entertained the peasants, and by the gratuities given by the universities to wandering students. In 1756, went to London, where, after some years of hard experience as a chemist's assistant and practitioner of medicine, he became a proof reader for the novelist Richardson. His "Inquiry into the Present State of Polite Literature in Europe" was chiefly important as leading to opportunities for better work; the "Citizen of the World" won him the friendship of Johnson and a membership in his Literary Club; "Life of Beau Nash" was followed by the "History of England," a work still read for its delightful style; "The Traveler" established his place as a poet, and "The Vicar of Wakefield," his only novel, is one of the choicest treasures of literature. "The Good-natured Man," comedy, "Roman History," "The Deserted Village," his best poem, "She Stoops to Conquer," his best comedy, were followed by the "Grecian History," long highly popular. The unfinished "Animated Nature" was his last undertaking, a well-written and pleasing work, but without scientific value.

Goldstücker (gölt'stük-ér), **Theodor,** 1821–72; German Orientalist; b. Königsberg; taught in Berlin; was a friend of Humboldt; went to London, 1849; assisted Prof. Wilson in preparing a Sanskrit-English dictionary; Prof. of Sanskrit, University College, London; president Philological Society; and, 1866, founded the Sanskrit Society; works include English translations of Hindu poems.

Golf (gölf), one of the oldest of outdoor sports, supposed to have originated with the Flemings some time prior to the fifteenth century, and then known as *kolf*. As played by them, however, kolf bore little resemblance to the game as it has been played in Scotland for at least four centuries. As early as 1457 golf was the national game. Indeed, so popular was the game in Scotland about the middle of the fifteenth century that Parliament passed an act restricting the play to certain days in the week, in order that the people might practice archery, which, it was claimed, they had neglected for the sake of golf. It is now very common throughout the United Kingdom, the British colonies, and the U. S., where there is hardly a city or town of any note that has not at least one golf club. The game consists in driving, with an implement called a "club," a hard gutta-percha ball, about 5¼ in. in circumference, from one hole in the ground (about 4 in. in diameter) to another, in a regular series of 18 or more holes, from 150 to 500 yds. apart. The player who "holes" the ball with the least number of strokes wins the holes, and he who wins the greatest number of holes in the round wins the game.

The game is usually played by two persons, but can be played by four, two on a side. When played by two, each player has a ball and about half a dozen "clubs" of various

France, Spain, Austria, Turkey, and compete with the real kidskin which comes largely from the same localities, but also from the E. Indies, Switzerland, and Ireland. The general term "kid glove" does not any longer convey the idea of a real kid or the young of a goat, but any leather "kid dressed."

The work of making gloves is done by women and girls. Gloves are generally made in factories, where long tables are fitted up attached to which are sewing machines run by steam or electric power. Gloves are made in parts by several operators. When they come from the cutters they are all fitted and the parts numbered, and must be so kept that the weight and colors may not be interchanged. After the backs are corded or embroidered the end of the silk is pulled and tied, then the glove is closed, by beginning either at the upper end of the long seam and sewing toward the little finger, or with the end of the index finger and finishing with the long seam. The gussets or fourchettes and thumb having previously been put in, the gloves are bound or hemmed or banded; sometimes the buttonhole is made after this process; if lacings instead of buttons are used they are then adjusted; the buttons are next put on; after this the gloves are "laid off," usually on steam-heated forms, then tied and boxed and thus made ready for the market. In 1900 the manufacture of gloves and mittens from leather in the U. S. represented a capital investment of $10,705,599, and the total output had a value of $17,740,385.

Glow'worm, wingless and nocturnally luminous female of *Lampyris noctiluca,* and other

GLOWWORM.

fireflies of Europe. In the U. S. luminous larvæ of various fireflies are named glowworms. See FIREFLY.

Glucinum (glū-sī'nŭm) or **Beryllium** (bē-rĭl'lĭ-ŭm), a metallic element (symbol, G; atomic weight, 9.3) whose oxide is known as glucina. Glucinum in nature commonly occurs as a silicate of glucina, as in the beryl, of which gem this earth constitutes fourteen per cent, or as an aluminate, as in the chrysoberyl. The glucinum chloride, when vaporized and passed over melted sodium, yields metallic glucinum, a white malleable metal (specific gravity 2.1) which cannot be burned, even in pure oxygen.

Gluck (glŏk), **Christoph Wilibald,** 1714–87; German composer; b. Weidenwang, Bavaria; instructed in music under the direction of the Jesuits; at twenty-two was sent to Vienna to study; and later was placed under Sammartini at Milan. At twenty-six he received an order to compose an opera for the court theater and produced "Artaserse," which achieved a triumph. Other operas followed, including "Demofoonte," "Ipermnestra," and "Fedra"—all for Italian cities. Invited to the Haymarket, London, he produced there, 1740, "La Caduta dei Giganti." At Paris, Vienna, Rome, and Naples he produced many pieces, marked like "Artaserse" by innovations in style. Two of these, "Il Trionfo di Camillo" and "Antigone," won for him the Order of Knight of the Golden Spur from Pope Clement XIII. He was director of the Court Opera, Vienna, 1754–64, and during that period composed the "Orfeo ed Euridice," which marked a new era. It was followed by "Alceste" and "Paride ed Elena." In 1774 he brought out in Paris the "Iphigénie en Aulide," which caused a controversy between the champions of the old and new schools; and, 1779, witnessed the production of his "Iphigénie en Tauride," written at the age of sixty-four, and ranked among the foremost of his compositions. His last opera, produced in Paris, was "Echo et Narcisse," 1779.

Glu'cose, a number of isomeric sugars having the composition $C_6H_{12}O_6$; in commerce in the U. S. the name given to the liquid varieties of the sugar made from cornstarch, the solid varieties being known as grape sugar. In France and Germany potato starch is the only available material for making this sugar, but in the U. S. the starch of Indian corn, or maize, is employed. The starch is first extracted from the corn in a state of sufficient purity, then transformed into sugar by treatment with dilute acid, and then neutralizing the acid, purifying, and concentrating the product. Starch sugar is used for making table sirup, for which it is mixed with molasses; as a substitute for barley malt in brewing ale and beer; as a substitute for cane sugar and adulteration in canning fruits; for adulterating honey.

Glu'coside, a substance yielding when treated with dilute acids (or certain ferments) glucose or a sugar of similar composition, and another substance not belonging to the group of carbohydrates. They occur in various plants, most frequently in the bark. Among the more important are arbutin, found in the leaves of wintergreen and of *arbutus uva ursi*; salicin, in willow bark; æsculin, in the bark of horse chestnut; amygdalin, in the oil of bitter almonds.

Glue, hard, brittle, glassy form of dried gelatin, containing impurities which give it a brownish color. It is the most important of the animal cements, and is usually obtained from the scraps of hides, the hoofs of animals, etc., by first cleansing with lime, then washing and airing so as to slake the remaining caustic lime, and then boiling in rain water, by which the albuminoid elements are changed into gelatin. Bone glue (bone gelatin) is prepared from fresh bones, either by digesting them with superheated steam, or with dilute hydrochloric acid, followed by boiling, the latter

process affording the best results. "Fish glue" is an inferior isinglass made from the offal of the fisheries. Glue is used in joinery, cabinet making, in preparing size for dressing paper, silk goods, etc., in calico printing, in making printers' rollers, in fresco painting, in paper hanging, in stiffening hat bodies, and for many other uses. See MUCILAGE; PASTE.

Glu'ten, nutritive substance obtained by kneading flour, especially wheat flour, in a stream of water, when the gluten remains behind as a sticky, adhesive mass. The flour contains two substances—vegetable myosin and an albumose—which undergo changes when mixed with water and are converted into gluten. The quantity of gluten in wheat flour varies, but in general it is present to the extent of eleven to thirteen per cent. Rye, oats, and barley flour contain very little gluten. The chief value of gluten in bread making is as a means of retaining the carbonic-acid gas and thus of facilitating the process of "raising."

Glut'ton, or **Wolverene** (wŭl-vĕr-ēn'), largest member of the weasel family, is from 3 to nearly 4 ft. long, clad in shaggy, dark-brown fur, with a much lighter band beginning just

GLUTTON OR WOLVERENE.

behind the shoulders and running along the side upward to the base of the tail. It is an inhabitant of the wooded N. portions of Europe, Asia, and N. America, and preys upon the smaller mammals, although it will attack and kill sick or wounded deer. It is savage, gluttonous, crafty, and persevering.

Glycerin (glĭs'ĕr-ĭn), sweet principle of oils, a triatomic alcohol, the base of the compounds found in animal fats and also in some vegetable substances, discovered by Scheele, 1779. It is a colorless, transparent, sweet sirup, without odor, of specific gravity 1.28; is inflammable, soluble in water and alcohol, and sparingly in ether. It may be cooled to −4° F. without freezing. Berthelot combined it with the fatty acids, and thus produced the organic fatty substances, stearine, margarine, olein, etc. Glycerin is a product of the process of saponification. It is obtained from the mother liquor of soap factories by adding a slight excess of vitriol, heating the solution with carbonate of baryta, filtering, concentrating by evaporation, and taking up the glycerin with alcohol, which is afterwards distilled off. Glycerin is formed in small quantities during the process of alcoholic fermentation. It dissolves the vegetable alkaloids and many other substances; is mixed with water to fill wet gas meters; serves as a solvent for some of the aniline colors; and is used in making nitroglycerin, and for many other purposes.

Gly'co, a sculptor of Athens (date unknown, but probably under the early Roman emperors), by whom the celebrated colossal statue of Hercules known as the Farnese Hercules was made. This was taken to Rome probably in the time of Caracalla, and placed in his baths, where it was discovered. The statue is supposed to be a copy from an original by Lysippus, and represents Hercules leaning on his club.

Glycogen (glī'kō-jĕn), a white, amorphous, starchlike, tasteless, odorless substance, found by Claude Bernard in the liver of man and the lower animals, and known to exist in other tissues, especially during fetal life. It may be dissolved by water out of the tissues where it exists, and then precipitated with alcohol. Diastase and saliva convert glycogen into maltose, a little glucose, and one of the modifications of dextrin.

Glycosuria (glĭ-kō-sū'rĭ-ā), a symptom of disease in which sugar is present in the urine. It is the prominent sign of the disease diabetes, but may occur in a variety of other diseases as a temporary condition, or may follow the taking of certain drugs like chloral, chloroform, and morphia. It is of frequent occurrence in the puerperal state, where its appearance indicates normality rather than disorder.

Glyp'todon, a gigantic extinct armadillolike animal. In a restricted sense the typical ge-

GLYPTODON.

nus of the family *Glyptodontidæ*, or *Hoplophoridæ*; also used as a popular name for any member of the group.

Glyptotheca (glĭp-tō-thē'kā), or **Glyp'tothek,** a modern term of which the English form is usually *glyptotheca*; a building for the reception of works of sculpture. The term Glyptothek is generally applied only to the sculpture gallery at Munich, built by King Ludwig I.

Gnat, any one of various small two-winged flies of the family *Culicidæ*, the most familiar

being the mosquito. Gnats differ from other two-winged flies (Diptera) by the long, slender mouth parts, which probe and puncture the flesh of its victim. The young are aquatic, living in pools. They are cylindrical, with the head and succeeding segments much enlarged, and breathe by means of a bunch of hairs radiating from a long tubercle at the end of the body, which connects with the internal respiratory tubes (tracheæ). They remain most of the time at the bottom of the pool, feeding upon decaying matter, and are thus beneficial scav-

1. Female. 2. Male.

GNAT.

engers. In the pupa state they take no food, and breathe by a respiratory tube, situated on the greatly enlarged thorax. The long cylindrical eggs are laid in little packets, which float on the surface of the standing water. In four weeks after hatching the insect reaches maturity. The females alone bite. No poison gland has yet been found in the head of the mosquito, the inflammation following the bite of one may be due to the irritation set up by the slightly barbed jaws, and perhaps to the slightly acrid saliva. About thirty American species of *Culex*, the genus to which the gnat belongs, are described. The buffalo gnat belongs to quite another family, the *Simuliidæ*. This minute insect is an inhabitant of the S. and SW. U. S., and becomes at times a great scourge of cattle. (See MOSQUITO.) For the gall gnat, see GALL INSECTS.

Gneisenau (gnī'zē-now), **August Wilhelm Anton** (Count Neithardt von), 1760–1831; German military officer; b. Schilda, Saxony; entered the Prussian army, 1789; in command of the fortress of Colberg, 1807, which he held against the French till the Peace of Tilsit; chief of staff and chief quartermaster to Blücher; after the Leipzig campaign was made lieutenant general; served in France, 1814; contributed much to the final success at Waterloo by his strategy after Ligny; governor of Berlin, 1818; general field marshal, 1825; led an army in Prussian Poland during the Polish insurrection of 1831.

Gneiss (nīs), a rock of granitic composition, but with a more or less pronounced parallel arrangement of its constituent minerals. As most granite shows some tendency to such a banded structure, gneiss must be regarded as the oldest, most widespread, and most fundamental of all the rocks. It is rich in metallic ores, but contains no fossils. It is a common rock in the U. S., especially in New England and New York.

Gneist (gnīst), **Rudolph von,** 1816–95; German jurist and politician; b. Berlin; professor in the university, 1844; member Prussian Chamber of Deputies, 1867–84; of the Imperial Parliament, 1875–77; instructor to Prince William in political science; author of "English Constitutional History," "Administrative Law in England," "History of the English Parliament," and numerous other historical and constitutional publications; ennobled, 1888.

Gnome (nōm), in mediæval mythology, the imaginary beings supposed to be the presiding spirits in the operations of nature in the mineral and vegetable world; have their dwelling within the earth, where they preside specially over its treasures, and are of both sexes. The males are often represented as misshapen dwarfs, of whom the well-known "Rübezahl," or "Number-nip," of German legend, is a familiar example.

Gnomic (nŏm'ĭk) **Po'ets,** in Greek literature, those didactic poets whose compositions are characterized by aphorisms and short, proverb-like moral precepts (*gnomai*). Preëminent among them are Theognis, Solon the lawgiver, Phocylides and Simonides of Amorgos.

Gnostics (nŏs'tĭks), "men of knowledge," adherents of numerous schools of heretics in the early Christian Church. Gnosticism came to denote a system of excessive and fanciful religious speculation. Its elements were derived from three sources: Hellenistic idealism, Oriental pantheistic naturalism, and Christian revelation. It did not begin as a heresy, but soon became such in undertaking to answer unanswerable questions. Its grand leading question was in regard to the origin of evil; but this question was only one of several. Its theme was really the whole "world-process." This process embraces the three problems of creation, sin, and redemption. The solutions offered were exceedingly diversified; the systems many and various. On four points these systems all, or nearly all, agree: (1) God is incomprehensible. (2) Matter is eternal and antagonistic to God; or, as Basilides taught, if created by God, still conditions and limits the divine efficiency. (3) Creation is the work of the Demiurge, according to some, only subordinate—according to others, totally opposed to God. (4) The human nature of Christ was a mere deceptive appearance. The most elaborate system was that of Valentinus. Gnosticism reached its highest bloom about 150 A.D. In the third century its creative energy was gone; in the fourth century it was powerless; in the sixth century only remnants of it remained. Severe laws against the Gnostics were enacted in 530 A.D. The rapidity with which the system waxed and waned is explained by the fact that it was an aristocratic heresy. The masses neither relished nor understood it. It was only a speculation of the few, and the aim was not to found sects, but schools. Only the Marcionites organized separate churches.

Gnu (nū), either of two species of S. African antelopes of the genus *Catoblepas* (or *Connochætes*). The body of the animal is stout, the legs slender, the neck bears a short, stiff

mane, and the tail is long and flowing like that of the horse. The muzzle is wide, and the horns, which are largest in the male, curve at first downward, then upward and forward.

White Gnu.

From their peculiar appearance the gnus are often termed horned horses, while the Dutch colonists christened them wildebeests on account of their savage looks and actions.

Goajira (gō-ä-hē'rä), peninsula of the N. coast of S. America; forming the W. side of the Gulf of Maracaibo, and crossed by the boundary between Venezuela and Colombia; contains about 5,800 sq. m., and is connected with the mainland by an isthmus 37 m. wide; belongs chiefly to Colombia.

Goat, popular name for the ruminant mammals of the genus *Capra*, of which the domestic goat is a familiar example. Although the domesticated goat has been introduced into all countries, goats are found wild only in the Old World. The so-called Rocky Mountain goat is an antelope. The origin of the domestic goat is uncertain, but while some consider the original species as extinct, there is reason to suppose that it may be the wild goat of central Asia. The male of this species is characterized by horns, which sometimes attain a length of 3 ft. As a result of long domestication, varied surroundings, and crossing, the domestic goat has developed into marked breeds, among which are the noted Angora and Kashmir goats. The former, which derives its name from Angora in Asia Minor, has slightly twisted horns and very long, curly, silky hair; there is a shorter and inferior under coat. The Kashmir goat is very similar to the Angora, but is of more delicate build, while it is the under coat of hair that is most prized. Of this are made the valuable Kashmir, or "camel's-hair," shawls. The flesh of goats is rather dry, and is inferior to mutton, but the hides make good leather and furnish a part of the kid gloves of commerce. The milk of the goat is sweet and nutritious.

Goat Is'land, island which divides the current of the Niagara River at the Falls; belongs to Niagara township, Niagara Co., N. Y.; area, 70 acres; is 900 ft. distant from the mainland of the U. S. and 2,000 from the Canadian shore; is connected with the New York shore by a substantial bridge.

Goat'sucker, a bird (*Caprimulgus europæus*) of the Old World, belonging to the order *Picariæ* or *Macrochires*, the type of the family *Caprimulgidæ*, to which belong the whip-poor-will, the chuck-will's-widow, the night hawk, and several other birds of the U. S., all of which are collectively called goatsuckers. The true goatsucker gets his name from the ancient belief that he sucks the milk of goats and cows, infecting the animals with a deadly disease. The bird is also called fern owl, dor-hawk, nightjar, etc.

Gobelin (gōb'ē-lĭn) **Tap'estry,** a kind of tapestry made only in the Gobelins factory, in the Faubourg St. Marcel, Paris. Some Gobelin tapestries cost from $30,000 to $40,000, and require from five to ten years for completion. Since 1791 none have been sold. They are mostly presented by the French Govt. to foreign courts. The first Gobelin factory was built by a Belgian wood-dyer of the fifteenth century, one Jehar Gobeelen.

Gobi (gō'bē) an immense desert tract in central Asia, occupying mainly the table-land between the Altai Mountains on the N. and the Kuenlun on the S.; about 1,800 m. long, with an average breadth of nearly 350 m.; area, about 600,000 sq. m. The W. part, drained by the Yarkand, which falls into Lake Lob, and having many salt lakes, is in E. Turkestan; the E., better known, and having a few fertile valleys and some towns, is chiefly in Mongolia, but a small part is in the Chinese province of Kansu. A large portion, called by the Chinese Shamo, or the Sand Sea, is a plain 2,500 to 3,000 ft. above the sea.

Goby (gō'bĭ), spiny-rayed fish, of the genus *Gobius*, found on the rocky and sandy coasts of the Old World. The black goby (*G. niger*), the largest on the British coasts, is about 6 in. long; has two dorsal fins; and the ventrals

Goby.

are united below the throat into a sucking disk by which it can attach itself to the rocks, to which it retires to devour its living prey. Gobies, like the allied blennies, are very tenacious of life, and will live a considerable time out of water. The males of several species guard the eggs in nests of seaweed till they are hatched.

God, the Supreme, Absolute Being, the Creator of the universe, the infinite, eternal and unchangeable Spirit. Under Christian ideas the word designates a self-existent and absolutely perfect, free, personal Spirit, distinct from and sovereign over the world He has

bought and sold, and would undoubtedly be regarded as a sufficient consideration for a promise to pay money.

Good'win Sands, a range of very dangerous sand banks in the Strait of Dover; 10 m. long and 5½ m. distant from the E. coast of Kent, and divided by an inlet called Trinity Bay into the N. Goodwin and S. Goodwin. The lighthouses of the N. and S. Foreland and light-ships stationed on the shoals guide passing ships, yet wrecks often occur here.

Good'year, Charles, 1800–60; American inventor; b. New Haven, Conn. In 1830 began experimenting with India rubber; in 1836 discovered a method of depriving the gum of its adhesiveness by dipping it into a preparation of nitric acid. In 1839 he accidentally discovered that India rubber mixed with sulphur and subjected to heat was not melted, but that portions of it remained elastic though deprived of adhesiveness. From this time vulcanization occupied his attention, but he reaped no adequate pecuniary reward, his patents being very expensive from the necessity of defending and protecting them against infringers.

Goorkhas (gôr'käz). See GHURKAS.

Goos'ander, American fishing duck of the subfamily *Merginæ* and genus *mergus*. The goosander (*M. Americus*) is about 27 in. long and 3 ft. in extent of wings; the bill about

GOOSANDER.

3 in., of a bright red color; weight, 5 lbs.; the female is considerably smaller. It is found throughout N. America, breeding in the temperate and N. region, in the neighborhood of both salt and fresh water. It is very voracious, feeding on fish, mollusks, and reptiles.

Goose, web-footed bird, of the order *Anseres* and family *Anatidæ*. The wild goose or gray lag of Europe (*Anser ferus*), the original of the common domesticated race, is of a gray color, with a brown mantle undulated with gray, and an orange bill. The bean goose (*A. segetum*) is by some considered a distinct species, and by others a mere variety of the wild goose. Wild geese seek high latitudes in the breeding season and in summer, returning to the warmer parts of Europe in the winter; they are found mostly in meadows and marshes in the interior, where they feed in the daytime on aquatic plants, grasses, and grains. Among the American species of the genus is the white-fronted or laughing goose (*A. Gambelii*); length, 28 in.; extent of wings, 5 ft.; weight, about 5¼ lbs. This species is found over the whole of N. America, but is rare along the Atlantic coast.

The American wild or Canada goose (*Bernicla canadensis*) is about 3 ft. long; extent of wings, 65 in.; weight, 7 lbs. It is found throughout N. America, and accidentally in Europe. It is readily domesticated, and when tame is advantageously crossed with the common goose, the resulting brood being larger and more easily raised and fattened than the

LAUGHING GOOSE.

originals. The brant goose (*B. brenta*) is 2 ft. long; extent of wings, 4 ft.; weight, 3½ lbs. This species may be known by the white crescent on the middle of the side of its black neck. It is a salt-water bird, and its flesh is esteemed as a most savory food. The barnacle goose (*B. leucopsis*) is 28 in. long; extent of wings, 4⅔ ft.; weight, a little over 4 lbs. It is common in winter in N. Europe, especially on the W. shores of Great Britain, but is doubtful as an inhabitant of the U. S. The common tame goose is the European wild bird domesticated, from which it varies considerably in color, though less than ducks and fowls do from their wild originals. The usual weight of a fine goose is 15 or 16 lbs., and by cramming this weight may be doubled. In the U. S. the common tame goose of Europe, in which the ganders are white and the females gray, is the most numerous. The white Bremen goose is of larger size, handsome, and easily raised, but less prolific and hardy. The Canada goose or wild goose (*Branta canadensis*) is a goose of the family *Anatidæ*; 30 to 35 in. long; brownish above, lighter beneath, with the head, neck, bill, and feet black, a white patch on each cheek; inhabits N. America, breeding at the N. and wintering in warmer regions. These birds usually fly in a

>-shaped figure (though sometimes in a straight line), led by an experienced gander, who frequently gives utterance to his familiar honk. "Their spring migrations usually take place from March 20th to the last of April, but are wholly dependent upon the state of the season. They breed at the N., and linger there till the hard frosts warn them that the lakes and streams will soon be frozen over." While performing their long journeys they usually fly at a great height, probably a quarter of a mile or more.

Goose'berry, small familiar garden fruit. The original species is indigenous to England, France, Germany, and Switzerland, and has been found in the Himalaya and on the banks

GOOSEBERRY.

of the Ganges; and there are several native species in the U. S. The cultivation of the foreign varieties of the gooseberry is somewhat difficult in this country, in consequence of dry weather in the early summer.

Goose'fish. See ANGLER.

Gopher (gō'fẽr), designation of certain burrowing animals; name specifically restricted in different parts of the U. S.; thus in the ex-

GOPHER (*Geomys bursarius*).

treme S. states it is used for the land tortoises which are peculiar to them, but in Georgia it is applied to a colubroid snake. In the W. states it is given to certain rodents, chiefly those of the family *Geomyidæ* and genera *Geomys* and *Thomomys*, but also (at least in some parts of Illinois and Wisconsin) to species of the genus *Spermophilus*. On the other hand, in the S. states the species of *Geomyidæ* are termed salamanders (a name originally given to certain batrachians), although other names are conferred, as "hamster," "pouched rat," "muloes," etc.

Gorakhpur (gŏr-ăk-pōr'), city and district of Benares, British India; district is between Nepal and the Gogra River; area, 4,598 sq. m.; pop. abt. 2,750,000; ninety per cent are Hindus; chief products, cotton and foodstuffs. Gautama Buddha died within the limits of this district. The capital is Gorakhpur, on the Rapti River, nearly in the center of the district. Pop. (1901) 64,148.

Go'ral, small antelope of Nepal, inhabiting rocky heights and lofty table-lands; is also called the Nepal bouquetin, and is hunted for its excellent flesh; an allied species occurs in Japan.

Gor'dian Knot. See GORDIUS.

Gordianus (gâr-dĭ-ā'nŭs), name of several Roman emperors, among whom were: MARCUS ANTONIUS AFRICANUS, 158–238; descended through his mother from the Emperor Trajan, and through his father from the Gracchi; was made consul, 213; in his eightieth year, when proconsul of Africa, was compelled by the leaders of the rebellion against Maximin to assume at Carthage the imperial title; senate at once proclaimed Gordianus and his son Augusti, and declared Maximin a public enemy. Meantime Capellianus, procurator of Numidia, marched against Carthage, and defeated and slew the younger Gordianus. His father thereupon died by his own hands, after a nominal reign of less than two months. MARCUS ANTONIUS PIUS, abt. 224–244; grandson of the preceding; proclaimed Cæsar at Rome after the death of the two Gordians in Africa; colleague of Balbinus and Maximus; and after their murder, 238, was proclaimed emperor by the senate and the troops; carried on a war against the Persians, whom he defeated in Mesopotamia, 242. He was murdered by his own troops, through the intrigues of his general Philippus, his successor.

Gor'dius, in Greek legend, King of Phrygia; born a common peasant; raised to the throne in accordance with an oracle which directed certain messengers to proclaim the first man they should meet seated in a wagon as they were on their way to the Temple of Zeus. Gordius was the man. He dedicated the wagon to Zeus, in whose temple at Gordius it was kept, and tied the yoke to the tongue. The oracle further declared that he who could untie the knot should be master of all Asia. In 333 B.C. Alexander made the attempt, and failing, cut the knot with his sword. By the goddess Cybele, Gordius had a son, Midas.

Gor'don, name of a celebrated Scottish historical family, the origin of which is wrapped in obscurity. It is probable that the family went to England with William the Conqueror. The earls of Sutherland, the barons of Lochin-

var, the viscounts of Kenmure, and the earls of Aberdeen are all branches of the Gordon family. The title of Duke of Gordon became extinct 1836, but was revived 1875.

Gordon, Adam Lindsay, 1833–70; Australian poet; b. Fayal, Azores; removed to S. Australia abt. 1853; successively a sheep farmer, a cattle driver, member of the mounted police, member of the Victoria Assembly, 1865, keeper of a livery stable; committed suicide at New Brighton; wrote "Sea Spray and Smoke Drift," "Ashtaroth, a Dramatic Lyric," "Bush Ballads and Galloping Rhymes," and "How We Beat the Favorite," a popular turf ballad.

Gordon, Charles George, 1833–85; British officer; called "Chinese Gordon," and "Gordon Pasha"; b. Woolwich, England; son of Gen. Gordon, of the Royal Artillery; entered the Royal Engineers, 1852; served in the Crimean War; in surveying and settling the Turkish and Russian frontier in Asia, and in the English expedition against Pekin, remaining on service in China. Entering the service of China, was made, 1863, commander of the "Ever-victorious Army," and was prominent in suppressing the Tai-Ping Rebellion, 1863–64, and recovering the great cities and silk districts from the insurgents. He was British consul for the Danube delta, 1864–74; succeeded Sir Samuel Baker in the service of the khedive as governor of the tribes of Upper Egypt; Governor General of the Sudan, developing great activity for the suppression of slavery, 1887–80; retired with rank of major general, 1881. In 1884, at the revolt of the mahdi, the English Govt. sent him to Khartum to remove the revolting garrisons and separate the Sudan from Egyptian rule. For five months he withstood the siege of Khartum. The expedition sent from England for his relief arrived two days after the city had fallen and Gordon and his garrison had been killed.

Gordon, Lady Duff (Lucy Austin), 1821–69; English author; b. London; daughter of John Austin, the jurist; married Sir Alexander Duff-Gordon, 1840; lived in Egypt after 1862; translated many works from the German, including Niebuhr's "Gods and Gods of Greece," and with her husband, Ranke's "House of Brandenburg" and "Ferdinand and Maximilian"; also wrote "Letters from the Cape," "Letters from Egypt," "Last Letters from Egypt."

Gordon, George (commonly called Lord George Gordon), 1750–93; English agitator; b. London; son of Cosmo George, third Duke of Gordon; served for some years in the navy; entered Parliament, 1774; was made president of Protestant Association, 1779; became leader of the No-Popery Party; presented a petition (signed by 120,000 persons) for the repeal of Saville's Roman Catholic Relief Bill, 1780, arriving at the Parliament House at the head of 50,000 rioters, who (June 2d–9th) sacked the chapels and the houses of Roman Catholics and others, broke open the prisons, and fired London in many places. He was tried for high treason and acquitted, 1781; declared himself a Jew in religion, 1786, but was without question insane; was fined and imprisoned for libel, 1788, and died in Newgate Prison.

Gordon, George Hamilton. See Aberdeen.

Gordon, William, 1730–1807; Anglo-American clergyman; b. Hitchin; removed to America, 1770; chaplain to the Provincial Congress of Massachusetts. Returning to England, 1786, published "History of the Rise, Progress, and Establishment of the Independence of the United States of America."

Gordo'nia, genus of trees and shrubs of the family *Ternstrœmiaceæ*. The U. S. have two species. The *G. lasianthus*, called loblolly bay, is a beautiful tree, from 50 to 70 ft. high (often a shrub in cultivation), growing in "bay swamps" in barren regions in the S. states. Its bark is useful for tanning leather. The *G. altamaha* is cultivated as a garden shrub, and has large white and richly fragrant flowers.

Gorge, local narrowing of a deep river valley, often called cañon in the W. U. S. The gorge of the Rhine from Bingen to Coblentz has been cut through the Hunsrück-Taunus plateau, whose uplift formed a barrier across the course of the river which then held a lake where the plain of the middle Rhine now stands. The gorge of the Danube through the Carpathians is similarly the outlet of an extinct lake, whose sediments now form the plain of Hungary. The lower cañon of the Yellowstone in Montana, is a gorge of the same nature. Short gorges through narrow ridges are called water gaps in Pennsylvania: as the Delaware, Lehigh, and Schuylkill water gaps in Blue Mountains. Many smaller gorges result from the obstruction of an open valley by glacial drift, and the displacement of its stream to a new line of flow. It thereupon rapidly proceeds to erode a new trench, which for a time deepens faster by stream cutting than it widens by weathering on the walls; in this way the many gorges in the N. U. S. are formed, the greatest being that of Niagara. Smaller gorges are called chasms in the Adirondacks, as the Ausable and Chateaugay chasms; or glens, as Watkins Glen in W. New York.

Gor'ges, Sir Ferdinando, abt. 1566–1647; English colonizer; b. Ashton, Somerset; a fellow conspirator with the Earl of Essex, 1601; as a leading member of the original Plymouth Company sent several unsuccessful expeditions to New England; in 1622, obtained a charter "for the governing of New England," and with John Mason was granted "Laconia," from the Kennebec to the Merrimac; in 1629, received a new grant of the region between the Kennebec and Piscataqua; lord proprietary of Maine, 1639; chartered the city of Gorgiana (now York, Me.), 1642; returned to England, 1643, and served against the Puritan armies. His son Robert was general governor for New England, 1623–24; his grandson, Ferdinando,

sold his hereditary rights in Maine to Massachusetts for £1,250, and wrote "America Painted to the Life."

Gor'gias, abt. 487–380 B.C.; Greek rhetorician; b. Sicily; sent to Athens to beseech succor for the Leontines attacked by the Syracusans, 427; captivated the Athenian populace by the splendor of his eloquence; and, spending the remainder of his life chiefly in Greece, gained Alcibiades, Alcidamas, Æschines, and Antisthenes for pupils or imitators. Plato gave his name to the dialogue which he composed against the Sophists. Portions of his work "On Nature" are extant.

Gor'gons, Greek mythology, three sisters (Stheno, Euryale, and Medusa), daughters of Phorcys and Ceto, who changed into stone whomsoever they looked upon; according to Hesiod, they had serpents for hair; they were placed in the garden of the Hesperides near the realm of Night, where Medusa was slain by Perseus.

Gorgophone (gâr-gŏf'ō-nē), Greek mythology, a daughter of Perseus and Andromeda, who married Perieres, King of Messenia, and after the death of Perieres married Æbalus; is the first whom the mythologists mention as having had a second husband.

Gorgophora (gâr-gŏf'ō-rä), in mythology, a surname of Minerva; from her ægis, on which was the head of the Gorgon Medusa.

Goril'la (native African name), species of anthropoid ape (*Troglodytes* gorilla), which occupies the first place among the quadrumanous mammals; inhabit dense forests in a comparatively small portion of W. Africa, in

GORILLA.

the Kongo district; is supposed to have been known to the Carthaginian navigator Hanno, but was first made known to science, 1847. The adult male gorilla is about 5 ft. 6 in. in height. The animal lives chiefly on vegetable food; forms a rude nest or sleeping place, much like that of the orang; and ordinarily will not attack man unless cornered or wounded. In walking, the natural position is on all fours; in attacking, the gorilla stands erect, and with its bristling hair, and large canine teeth, presents a terrible appearance. A few young gorillas have been taken to Europe, but soon succumbed to pulmonary diseases.

Gor'ky, Maxim (ALICKSEI MAXIMOVITCH PIESHKOV), 1868– ; Russian author; b. Nizni Novgorod; successively a draughtsman's apprentice, assistant to a painter of icons, cook's boy on a steamer, a gardener's assistant, a worker in a bakery, a woodchopper, a night watchman of railroad cars, a worker in a machine shop, wandering from town to town; published "Makar Tschudra," a story in a local newspaper abt. 1893; returned to his home and contributed sketches to various magazines; became a leader of the Reform Party; was twice imprisoned; lived in Finland for a time, 1906; visited the U. S., 1906; works include the plays "The Petty Townspeople," "The Night Refuge," "The Barbarians," and novels and sketches, including "The Orloff Couple and Malva," "Twenty-six of Us and One Other," "Foma Gordyeef," "About the Devil," "The Outcasts," "Three Men," "Mother."

Görlitz (gör'lĭts), town of Prussia; province of Silesia; on the Neisse, here crossed by a viaduct of 1,500 ft. long, 115 ft. high. It is fortified, and has foundries, weaving and bleaching establishments, and manufactories of cloth, cotton, linen, and leather. Among its buildings is the Church of St. Peter and St. Paul, built in the fifteenth century, a remarkable specimen of Gothic architecture. Pop. (1905) 83,766.

Gör'res, Jakob Joseph, von, 1776–1848; German author; b. Coblenz; began as a radical; founded two periodicals, *The Red Sheet*, 1797, and another, 1798, both suppressed; attempted the incorporation of the Rhenish provinces with France, 1799, but failed; taught in the College of Coblenz; published, 1807, the first part of "German Popular Legends"; 1810, "Asiatic Mythology"; 1813, "Lohengrin"; established and published, 1814–16, *The Rhenish Mercury*, which inflamed the people against France; advocated the establishment of a German confederation; published "Germany and the Revolution," "Europe and the Revolution," "Christian Mystics," and other works.

Gorse (gôrz). See FURZE.

Gor'ton, Samuel, abt. 1600–77; American religionist; b. Gorton, England; went, 1633, to Boston, Mass.; expelled for heresy; banished from Plymouth, for same reason, 1637; whipped at Newport, R. I., for slandering the magistrates; settled at Shawomet (now Warwick), 1642, but with ten of his followers, "Gortonians," was taken to Boston, tried for "damnable heresy," and again banished; became a preacher and magistrate at Warwick; published religious works. His sect survived for years, and his followers were called "Noth-

ingarians," because they repudiated religious forms, and recognized no ministry.

Gortschakoff (gōrt-chä-kōf'), **Alexander Michaelowitsch** (Prince), 1799–1883; Russian statesman; b. St. Petersburg; in different diplomatic positions at Vienna, Florence, Stuttgart, and other cities acquired experience and dexterity, but it was his eminent success in keeping Austria neutral during the Crimean War, at which time he represented Russia at the court of Vienna, which first made him conspicuous as a diplomat. In 1856 he succeeded Count Nesselrode as Minister of Foreign Affairs, and, 1863, Chancellor of the empire. In 1871 he attended the London Conference, where he procured the revision of the Treaty of Paris and another abrogating the neutralization of the Black Sea. After the outbreak of the Turco-Russian War of 1877 his influence began to decline, and at the Congress of Berlin his designs were thwarted by Bismarck and Beaconsfield. In 1882 he was superseded as minister by M. de Giers.

Gortyna (gōr-tī'nä), or **Gortyn** (gōr'tīn), one of the principal cities of Crete; at the SE. foot of Mt. Ida in the plain of the small river Lethæus. Gortyn was the rival of Cnossus up to the Roman conquest, when Gortyn became the metropolis on account of its nearness to Egypt and the Cyrenaica. In 1884 the greatest of Greek inscriptions, containing the law code of Gortyn was discovered. This law code is of the utmost importance because it tells us much about the ancient laws of Crete, which was the lawgiver of all Greece.

Görz (görts), or **Göritz** (gö'rĭts), capital of the Austrian crownland of Görz-Gradisca; near the Isonozo; 35 m. NNW. of Trieste; principal buildings include the old castle of the former counts of Görz and the former Jesuit college, both now used as barracks; the cathedral, with a beautiful sacristy; the prince bishop's palace, etc. Görz's specialty has long been the printing of Hebrew books for the East. In a Franciscan cloister close by are the graves of Charles X of France, the Duc d'Angoulême and his wife, and the Comte de Chambord. Pop. (1900) 25,432.

Go'schen, George Joachim (first Viscount), 1831–1907; British statesman; b. London; entered mercantile life, 1853; elected to Parliament as a Liberal, 1863; privy councilor, 1865; First Lord of the Admiralty, 1871–74; ambassador extraordinary to Constantinople, 1880–81; Chancellor of the Exchequer, 1887; carried through a bill for the reduction of the interest on the national debt, 1889; lord rector of Aberdeen Univ., 1887, and of Edinburgh Univ., 1890; First Lord of the Admiralty, 1885–1900; viscount, 1900; published "The Theory of the Foreign Exchanges," etc.

Gos'hawk, large hawk (*Astur palumbarius*) inhabiting Europe and N. Asia; is from 18 to 23 in. long, with a spread of wings about 3 ft. It is the largest of the short-winged hawks formerly employed in falconry, and was in great demand owing to its dash and courage. The N. American goshawk (*Astur atricapillus*) closely resembles its Old World congener in color, but is somewhat larger.

American Goshawk.

Go'shen, Hebrew form of the name of the district of Lower Egypt which the Pharaoh of Joseph's time assigned to Jacob and his descendants (Gen. xlvii, 6), and from which the Israelites spread over a large part of the E. Delta. Its exact limits cannot be given, but it was near the Hyksos stronghold Bubastis (Pi-Beseth, cf. Gen. xlv, 10), and probably embraced the territory between the modern Zagazig, Belbeis, and Telel-Kebir. Goshen is also the biblical name of a district in S. Palestine (Josh. x, 41; xi, 16) and of a town (Josh. xv, 51)—both uncertain.

Gos'lar, town of Germany; in Hanover, on the Gose; 27 m. SE. Hildesheim. Founded abt. 920 by Henry the Fowler, it was for a time the capital of the empire, and a place of much splendor. It remained a free city of the empire until 1802, and was joined to Hanover, 1816. The industries are mainly connected with the neighboring mines of silver, copper, and other metals. Pop. (1900) 16,403.

Gos'nold, Bartholomew, d. 1607; English mariner, who first appears as an associate of Raleigh in his unsuccessful attempt to found a colony in Virginia. In 1602 he sailed from Falmouth for New England, entered Massachusetts Bay, named Cape Cod, discovered No Man's Land, and named it Martha's Vineyard (a name since given to a much more important neighboring island), and planted his colony on Cuttyhunk (now in the township of Gosnold, Mass.); but the settlers became discouraged and soon returned. On December 19, 1606, he sailed with another colony to Virginia, which chose for its first settlement Jamestown.

Gos'pel, English equivalent of Greek word meaning "a joyful message," applied to either the whole system of the doctrines of Christ or to one of the four accounts credited to Matthew, Mark, Luke, and John. What are known

as the canonical gospels are properly only one and the same gospel, in its fourfold aspect and relation to the human race. Hence they are styled in ancient manuscripts the Gospel *according to* (not *of*) Matthew, Mark, Luke, and John. The first and fourth are, according to the traditional view, by apostles; the second and third by pupils of the apostles. The first three gospels were possibly written between 60 and 70 A.D., certainly before the destruction of Jerusalem, to which they point as a future event. The last was probably written toward the close of the first century, at Ephesus. Before the end of the second century they were generally received and used in the churches as one collection.

Each gospel has an individuality corresponding to the author's education, talent, taste, and mission. Matthew wrote in Palestine and for Jews, to show them that Jesus is the fulfiller of prophecy and the true King and Lawgiver of Israel; Mark in Rome, for Roman readers, to exhibit Jesus as the mighty Wonder-worker and Son of God; Luke, for Greeks and Gentiles, to set him forth as the universal Savior of all men; John, for Jewish and Gentile Christians combined, and for all future ages.

The first three evangelists agree much in matter and language, and are called *Synoptists* (their gospels the *Synoptic* gospels).

A number of spurious biographies of Jesus and the holy family, purporting to come from apostles or their pupils, but written in the second, third, and later centuries by unknown authors, are the first specimens of religious novels, replete with extravagant fancies and unnatural miracles. They enable us to trace some of the traditions and superstitions of the mediæval Church to their proper source. The principal of these apocryphal productions are the "Gospel of James" (Protevangelium); the "Gospel of Pseudo-Matthew on the Infancy of Mary and Jesus"; the "Gospel of the Nativity of Mary"; the "Gospel of Joseph the Carpenter"; the "Gospel of Thomas"; the "Gospel of Nicodemus"; the "Acts of Pontius Pilate"; and his "Letter to Tiberius" on the death of Christ; and the "Gospel of Peter." The references in the Koran to the gospel history are from these apocryphal sources.

Gos'pellers, term applied (1) by Roman Catholics to those reformers who taught the people the words of Scripture in their own language; (2) to a class of Antinomians who drew "strange inferences" from the doctrine of predestination; (3) to the priest in the Church of England who reads the Gospel in the communion service from the N. side of the altar.

Gos'samer, long, light filaments spun by certain small spiders. Some of these float in the air and carry the spider with them, perhaps in search of prey. Others are stretched upon the ground, and are believed to serve to collect the dew, of which many spiders have been known to drink very frequently. In the folklore of various nations they are regarded as shreds of the Virgin Mary's neckcloth, which she cast away at the time of her assumption.

Gosse, Edmund William, 1849– ; English author; son of Philip Henry Gosse; b. London; was appointed assistant librarian at the British Museum, 1867; translator to the Board of Trade, 1875–1904; Clark Lecturer in English Literature at Trinity College, Cambridge, 1884–90; in 1884 lectured in the United States at Harvard, Yale, and Johns Hopkins univs.; published "Madrigals, Songs, and Sonnets," "On Viol and Flute," "The Unknown Lover," "Northern Studies," "Seventeenth Century Studies," "From Shakespeare to Pope," "Lives of Raleigh," "Congreve," "History of Eighteenth Century Literature," "Gossip in a Library," "Questions at Issue," "A Short History of English Literature," and many other works.

Gosse, Philip Henry, 1810–88; English naturalist; b. Worcester; lived in Newfoundland, 1827–35; in Canada, as a farmer, 1835–38, and in Alabama, as a school teacher, 1838–39, when he returned to England; author of many books, including "The Canadian Naturalist," "Birds of Jamaica," "Natural History," "Text-book of Zoölogy," "A Naturalist's Rambles," "The Aquarium," "Marine Zoölogy," "Actinologia Britannica."

Gossypium (gŏs-sĭp'ĭ-ŭm), genus of plants to which the cotton plant belongs.

Got (gō), **François Jules Edmond,** 1822–1901; French actor; b. Lignerolles, Orne; made his début in the Comédie Française, 1844, and became sociétaire, 1850; played a great number of rôles in the classical comedy. In the modern drama, among his brilliant creations were *Giboyer*, in "Le fils de Giboyer"; *André Lagarde*, in "La Contagion"; *Bernard*, in "Les Fourchambault"; *Jean*, in "Rantzau," and *Fermier*, in "Vincenette." In 1881 he was created a knight of the Legion of Honor, the first actor of France to receive such a distinction. He was the dean of the Société of the Comédie Française; considered the foremost comedian in France.

Göta (gō'tä), a large river in S. Sweden, carrying the water from Lake Wener to the Cattegat; is celebrated for the romantic beauty of its shores and for its magnificent cataracts. The river is connected with the Baltic through Lakes Wener and Wetter by a system of locks and canals (Trollhätta and Gota Canal).

Go'tama. See GAUTAMA.

Gotha (gō'tä), town of Germany, near the Thuringian forest; one of the capitals of the duchy of Saxe-Coburg-Gotha. The ducal palace, Friedenstein, contains a library of 200,000 volumes and a very fine collection of coins and medals. There is a museum with valuable collections, and an observatory. The manufactures include fire engines, pipes, shoes, sugar, and toys. Gotha is the seat of much literary enterprise (the "Gotha Almanac," the geographical establishment of Justus Perthes, etc.) and considerable industry and trade. It has a beautiful park and one of the most famous gymnasiums in Germany.

Gotha, Duch'y of. See SAXE-COBURG-GOTHA.

Go'tham, parish of Nottingham, England, whose people (according to tradition) have been famous ever since King John's time for their stupidity, so that "a wise man of Gotham" became a synonym for a fool. Irving, in his "Salmagundi," applied the name Gotham to New York City.

Goth'ic Ar'chitecture, style of architecture which was developed out of the Romanesque in W. Europe in the twelfth century, and which existed, though much modified with time, until the classical revival in the sixteenth century put an end to it. (See RENAISSANCE.) The especial virtue of this style is its free use of rich sculpture so combined with the architectural forms as to make one with them. The word *Gothic* was first used in a contemptuous sense by those writers of a later time who wished to praise classical art at the expense of that of the Middle Ages. Early in the nineteenth century a disposition to use this style appeared in England, France, and Germany. In England especially this led to important results. See ARCHITECTURE.

Goths, extinct Germanic race, first mentioned as dwelling on the coasts of the Baltic during the fourth century B.C., and disappearing from history in the eighth century A.D. Their origin has not been ascertained. Modern authorities consider the Vandals, Heruli, Rugii, Gepidæ, Alani, Suevi, Longobards, Burgundians, and Franks as families of the Gothic race. In the later half of the second century A.D. the Goths properly so called appear on the N. shores of the Black Sea. In the third century they were in possession of the region N. of the Lower Danube. They invaded Roman territory, 237; ravaged Greece, 262; and obtained possession of Dacia, 272. In the fourth century they had become divided into Ostrogoths and Visigoths, or E. and W. Goths. The former inhabited S. Russia between the Dneister and the Don; the latter the territory from the Lower Danube to the Carpathian Mountains, and from Hungary to Bessarabia. Defeated by the Huns, 375, they seized Mœsia (Bulgaria and Servia), defeated Valens, 378, and ravaged Achaia and Pannonia.

The Visigoths submitted to the Romans, 382; the Ostrogoths finally settled in Thrace and Phrygia. After the death of Theodosius, an army of Goths under Alaric marched into Italy and sacked Rome. The Ostrogoths gradually intermingled in blood with the inhabitants of Italy. In 451 the Huns under Attila were defeated by the combined Romans and Goths under Aëtius. Meanwhile Spain and S. France came under Visigothic dominion; and Odoacer, a prince of the Heruli, dethroned Augustulus, the last of the W. Roman emperors, and assumed the title of King of Italy (A.D. 476). He was defeated by the Ostrogoths under Theodoric, who put him to death (493), and took possession of all Italy. After the death of Theodoric (526), Justinian sent Belisarius, and subsequently Narses, into Italy. Rome was taken, and though for a time Totila revived the Gothic cause, the monarchy became extinct with the death of his successor, Teias, 553. In Spain and S. France the Visigoths maintained a splendid monarchy till 711, when the Moors subjugated the kingdom. The Goths became cultivated and enlightened, and governed Italy well. The laws of the Visigoths were codified fifty years before the Pandects of Justinian.

Got'land, or Goth'land, island in the Baltic belonging to Sweden; area, 1,227 sq. m.; capital, Wisby. The climate is mild, and the inhabitants are engaged chiefly in agriculture, shipping, fishing, and lime burning. Pop. (1901) 52,781.

Got'tenborg, town of Sweden, province of Gothland, on the Gota, near its mouth; was founded, 1619, by Dutch settlers, is regularly laid out, and has several canals. The museum contains important collections; chief among the public buildings are the town hall and the exchange. Gottenborg has an excellent harbor and a very extensive trade, exporting iron, copper, timber, tar, and fish. Its shipbuilding and manufactures of sailcloth are especially important. Pop. (1906) 156,927.

Gottenborg Sys'tem, liquor-licensing system, which originated in Gottenborg, Sweden, 1865; gives the exclusive control of liquor shops to a company licensed by the town; business is conducted by salaried managers, and all profits above five per cent go into the town treasury. The effect of the system has been to improve the quality and decrease the quantity of liquors consumed. The adoption of the system has been agitated in recent years in several cities of the U. S.

Gotthard (gŏth'ärd), **St.** See ST. GOTHARD.

Gottfried (göt'frēt), **of Strassburg** (strās'-bŏrg), German poet or Minnesinger; flourished latter part of the twelfth and beginning of the thirteenth centuries. Strassburg is supposed to have been his birthplace. His chief work, the epic poem of "Tristan und Isolde," begun between 1204 and 1215, was unfinished at the time of his death, within the first quarter of the thirteenth century. It was one of the finest specimens of mediæval poetry extant, considered by many critics the equal of Eschenbach's "Parcival." The influence that it exercised on German literature is attested by the number of writers who afterwards treated the theme in Gottfried's manner. In its unfinished state the poem contains between 19,000 and 20,000 lines, to which additions were made, far inferior to the original. Of his other works a few short lyrics are all that remain.

Göt'tingen, town of Prussia; province of Hanover, on the Leine; has some manufactures of woolens, tobacco, and leather; is chiefly noted for its university, with which are connected an excellent library, a museum, a botanical garden, an observatory, an anatomical theater, a chemical laboratory, and other scientific institutions. It was founded, 1737, by George II, King of England and Elector of Hanover, and became one of the most celebrated universities of Germany. The university is an institution of great repute and influence, and usually has about 1,600 students. Pop. (1900) 34,234.

Gottschalk (gŏt'shălk), abt. 806–68; German theologian; son of Count Berno of Saxony; entered a Benedictine monastery at Fulda, later one at Orbais; propagated predestinarian doctrines, involving a denial of the freedom of the will and the universality of the atonement; was condemned by the Council of Metz, 848, was publicly flogged, and then imprisoned for life in the Abbey of Hautvilliers.

Gottschalk, Louis Moreau, 1829–69; American pianist; b. New Orleans; made his first public appearance in Paris, 1845; returned to the U. S., 1853, and became the most popular pianist in the country; made many concert tours, always playing his own compositions; traveled extensively in Mexico, the W. Indies, and S. America; works include two operas never published ("La Meit des Tropiques" and "Montevideo"), symphonies, a triumphal cantata, an overture, many piano solos, and a few songs.

Gottsched (gŏt'shĕt), **Johann Christoph,** 1700–66; German author; b. Judithenkirch; was for thirty-two years Prof. of Logic and Metaphysics at Leipzig; became president of the Literary Society of Leipzig in 1726; and for a time held a sort of literary dictatorship in Germany, as a purist and adversary of the Zurich school, which preferred originality and genius; wrote tragedies, philosophical treatises, etc.; but his chief merit was in contributing to make the German language the sole medium of instruction, by publishing in it scientific and philosophical manuals and abridgments.

Gough (gŏf), **Hugh** (Viscount), 1779–1869; British military officer; b. Woodstown, Ireland; joined the British army, 1794; served with distinction at the Cape of Good Hope, 1795, and in Spain, 1809–13; became a major general, 1830. He led the land forces in the Chinese Opium War, 1841; commanded the British forces against the Mahrattas, 1843, and the Sikhs, 1845; was made a baron, 1846; commanded in the second Sikh War, 1848–49; created viscount and handsomely pensioned, 1849; field marshal, 1862.

Gough, John Bartholomew, 1817–86; American temperance lecturer; b. Sandgate, England; removed, 1829, to the U. S.; became a bookbinder in New York, 1831, and after some years of poverty, caused by intemperance, reformed, and, 1843, began to lecture on temperance and other subjects both in the U. S. and Great Britain; published "Autobiography," "Orations," "Temperance Lectures," "Sunlight and Shadow; or, Gleanings from My Life Work."

Goujon (gō-zhōn'), **Jean,** b. abt. 1515; French sculptor; b. Paris; said to have been killed on St. Bartholomew's day, August 24, 1572, but late writers deny this; produced the beautiful sculptures of the rood loft of St. Germain-l'Auxerrois, and those at Rouen in the cathedral and in the Church of St. Maclou. The celebrated group of "Diana and the Stag," now belonging to the Louvre, and the "Fontaine des Innocents," are also by him. He was also employed as an architect on the old Louvre.

Gould, Benjamin Apthorp, 1824–96; American astronomer; b. Boston; conducted the *Astronomical Journal* at Cambridge, Mass., 1849–61; was director of the Dudley Observatory at Albany, and superintended its construction and arrangement, 1856–59; appointed to organize and direct the National Observatory of the Argentine Republic at Cordova, 1868; began work there, 1870; completed a set of maps of the stars visible with the naked eye from his observatory, and took observations on more than 83,000 of them; also organized a national meteorological office, and made various telegraphic determinations of longitude; returned home, 1885; principal works, "Investigation of the Orbit of Comet V," "Report on the Discovery of the Planet Neptune," "Discussions of Observations made by the U. S. Astronomical Expedition to Chile, to determine the Solar Parallax," and "Discussion on the Statistics of the U. S. Sanitary Commission."

Gould, Jay, 1836–92; American financier; b. Roxbury, N. Y.; early became a surveyor; engaged in railroad operations, 1857; was for many years an official of the Erie Railroad; invested in the various Pacific railroads; acquired control of a number of important lines, and by building branches and effecting combinations created what was known as the "Gould system"; left property said to be worth $72,000,000.

Gould, John, 1804–81; English naturalist; b. Lyme, Dorcet; was employed in preparing specimens for the London Zoölogical Society; resided some time in Australia; published "A Century of Birds from the Himalayan Mountains," "The Birds of Europe," "Birds of Australia," "Mammals of Australia," "Handbook to the Birds of Australia," and numerous monographs, including "On the Partridges of America."

Gounod (gō-nō'), **Charles François,** 1818–93; French composer; b. Paris; son of a painter; at first composed ecclesiastical music; became precentor and organist of the "Missions Étrangères"; came into notice through his "Solemn Mass"; was conductor of the "Orphéon," a union of male singing societies and vocal schools, 1852–60; in 1870–75, lived in London, and there founded "Gounod's Choir," a mixed choral society; devoted his last years mainly to sacred composition, producing the sacred trilogies, "The Redemption" and "Death and Life," masses, etc.; began to write for the operatic stage, 1850; best-known work, "Faust," 1859; other operas include "The Physician in Spite of Himself," 1858; Philemon and Baucis," 1861; "Mireille," 1862; "The Queen of Sheba," 1862; "Romeo and Juliet," 1867; "Polyeucte," 1878; "The Tribute of Zamora," 1881. He also wrote symphonies, cantatas, instrumental music, and songs.

Goupil (gō-pē'), **Jules Adolphe,** 1839–83; French genre and portrait painter; b. Paris; pupil of Ary Scheffer. His pictures are good technically, and harmonious in color. His "Last Days of Madame Roland" (1880) is in the Luxembourg Gallery in Paris.

Gaur (gowr), or **Gour,** mediæval city of importance, now an insignificant village; in Malda district, Bengal, British India, between the town of Malda and the Ganges River; is first mentioned in history, 1243, but it had apparently long been a dynastic center under the name of Lakhnaoti; was abandoned in the sixteenth century, as a result of a pestilence; ruins cover a space 7 by 2 m.

Goura (gō'rā), common as well as generic name of the large crowned pigeons constituting the family *Gouridæ*. They are the largest of living pigeons, measuring over 2 ft. in length, and are distinguished by a large, erect, fanlike crest of loose feathers. The half-dozen known species are confined to New Guinea and a few of the adjacent islands.

Gourd, name applied in Europe to plants of the order *Cucurbitaceæ* in general, but restricted in the U. S. to the *Lagenaria*, the hard shell of which is put to various domestic uses. To the gourd family belong the pumpkin, squash, watermelon, cucumber, muskmelon, and several others cultivated for ornament or known as weeds. The common gourd, bottle or calabash gourd, *Lagenaria vulgaris*, is a native of Asia and Africa; it climbs to a great distance, and has clammy, unpleasantly scented leaves. The commonest form is shaped like a water bottle with a large base and a swollen handle; the rind of this when ripe is very hard and woody. By making an opening in the stem end and removing the contents, it makes, after soaking to remove the bitterness, an excellent water bottle. With an opening in the side it is a convenient dipper; and when sawed in two across the larger part, the lower portion forms a dish, while the upper serves as a funnel.

Gourgaud (gōr-gō'), **Gaspard** (Baron), 1783–1852; French soldier; b. Versailles; entered the army, 1802; accompanied Napoleon to Russia as ordnance officer; at Moscow was made a baron for preventing an explosion of 5,000 cwt. of gunpowder stored in the Kremlin. After the battle of Leipzig saved the corps of Oudinot by delaying the command of Napoleon to destroy the bridge of Freiberg; in the campaign of 1814, saved Napoleon at Mézières from a troop of Cossacks; was among the last on the field of Waterloo; shared Napoleon's exile for three years; became a lieutenant general, 1830; a peer 1841; and a member of the Legislative Assembly, 1849.

Gourko (gōr'kō), **Joseph Vassilyévich,** 1828–1901; Russian military officer; member of a Lithuanian family; became colonel in the army, 1861; major general, 1867, joining the emperor's suite; took part in the Crimean War; won distinction in the Russo-Turkish War; made the passage of the Balkans in midwinter, 1877–78; was created a count, 1878; made a general of cavalry and adjutant general of the emperor's chief general staff; Governor General of St. Petersburg, 1879–81; made Governor General of Poland, 1883, and commander in chief of troops in Poland and Lithuania, 1892; field marshal, 1894.

Gout, painful disease affecting principally the smaller joints, and characterized chiefly by the abnormal presence of uric acid in the blood and the deposit of urate of soda in the fibrous tissue around the joints and sheaths of tendons. Gout is rare before the age of twenty, and men of robust constitution and of a mixed sanguine and bilious temperament are far more liable to it than women. It is also hereditary, and often attacks the upper ranks of society, who indulge in a highly nitrogenous diet, which tends to produce uric acid in excess. In the lower classes, who use less animal and stimulating food, and breathe more oxygen from their daily exercise, the uric acid becomes oxalic, and the gouty diathesis manifests itself in neuralgia with oxalate of lime in abundance in the urine. The judicious use of purgatives, abstinence from highly nitrogenous food and stimulating drinks, attention to hygienic rules, and avoiding exposure to damp, cold, and fatigue of body and mind, are necessary as aids in the treatment of this disease.

Gov'ernment, in a restricted sense, the exercise of that inherent, absolute power existing in every distinct and separate organized society or state, of self-determination and self-control for self-preservation which springs by nature from its own social forces, and the laws which control their action. The most marked differences between the different forms of government are those which indicate the propriety of their being arranged generically into two classes—single and confederated. A single government is that of a distinct state founded on the social compact. A confederated government is that of a union of two or more single governments founded on what is known as the federal compact. Writers usually divide single governments into five general kinds —monarchies, aristocracies (or oligarchies, as they are sometimes styled), democracies, republics, and mixed governments, or those partaking of the qualities of two or more of the others. Monarchies are usually subdivided into various kinds, such as absolute, limited, hereditary, and elective. Democracies are also subdivided into several kinds, the most familiar of which are the pure and representative. In a pure democracy all questions pertaining to public affairs are decided by the body of the people in general assembly convened. In a representative democracy the functions of government are performed by agents, deputies, or delegates selected by such electors from the body of the people as may be empowered to make the choice by the fundamental law or constitution. The power of choosing such deputies is what is known as the franchise. It is an office conferred by organized society, and therefore a matter of trust and not a matter of natural right.

Gov'ernor, an instrument attached to prime movers for the purpose of preserving regularity of motion by adjusting the amount of power exerted to the work to be done, where the latter is variable. Governors differ, as regulators, from fly wheels in preserving uniformity of motion without necessarily permitting change of mean speed. Governors proper are divided into three classes: *position governors, disengagement governors,* and *differential governors.*

Position governors are those in which the position of the regulating valve or regulating piece is determined by rigid connection with the governor; as, for example, the common fly-ball governor used on the steam engine. Disengagement governors are those which, when the speed rises above a certain fixed maximum, throw into gear a train of mechanism which shuts off the supply of impelling fluid, and causes a diminution of speed; and, when the speed falls below a stated minimum, it throws into gear another train producing the reverse effect. The usual forms of water-wheel governors are examples of this class. Differential governors are those which move the regulating mechanisms with a speed proportional to the difference between the actual and the proper speed of the engine. A second classification divides governors into gravity governors—in which gravity and centrifugal force are opposed—and balanced governors, in which centrifugal force is balanced by a spring or by other force than gravity.

Governor's Is'land, island of Suffolk Co., Mass., in Boston harbor, directly N. of Castle Island and of the main ship channel or President Roads; is occupied by fortifications (of which Fort Winthrop, a small inclosed quadrangular work with exterior open barbette batteries, is the *keep* or *réduit*), forming part of the system of defense of Boston harbor and its maritime approaches. Also the name of a fortified post of the U. S., in New York harbor, at the entrance of the East River, about ½ m. S. of the Battery, and separated from Brooklyn by Buttermilk Channel; contains Castle William, Fort Columbus, and South Battery, the last commanding the entrance to Buttermilk Channel. Besides the fortifications and garrisons, the Ordnance Department has one of its dépôts here, and the island has for some years been the headquarters of the Department of the East. The island is also the headquarters of the Military Service Institution, whose library and extensive collection of war relics, etc., occupy two buildings. The Government has greatly extended the area of the island on the S. by building a heavy stone sea wall and filling in.

Gow'er, John, abt. 1325–1408; English poet; b. probably York; was intimate with Chaucer, who dedicates his "Troilus and Cressida" to him, calling him "moral Gower"; and Gower's "Confessio Amantis" introduces Venus calling Chaucer "my disciple and my poete"; chief works: the "Speculum Meditantis," a treatise on married life, in French verse; the "Vox Clamantis," a Latin poem on the insurrection of the Commons under Richard II; and the "Confessio Amantis," an English poem in eight books.

Goyanna (gō-yăn'nä), city of Pernambuco, Brazil, on the Goyanna River, near the sea, and 30 m. N. of Recife; has a trade in cotton, sugar, rum, hides, timber, fancy woods, and castor oil; is one of the oldest towns in Brazil, was a point of importance during the struggles with the Dutch in the seventeenth century. Pop. (1906) abt. 15,000.

Go'zan, in ancient geography, a province of Media, to which Tiglath Pileser, and afterwards Shalmanezer, sent the captive Israelites; country was named after the Gozan River, now called the Kizzie Ozan, or Golden River, which rises in NW. Persia and flows NE. into the Caspian Sea.

Gozzi (gŏt'sē), **Carlo** (Count), 1722–1806; Italian dramatist; b. Venice; was distinguished as a wit in Venetian society, and his dramatic pieces, based on fairy tales, were exceedingly popular, especially "Turandote," which Schiller adapted to the German stage.

Gozzoli (gŏt'sō-lē), **Benozzo**, 1424–96; Italian painter; b. Florence; was a pupil and assistant of Beato Angelica and of Masaccio; executed many works in Florence, Pisa, and other Tuscan cities; also painted in Rome; apparently was the first painter to actually use a model; introduced portraits of his contemporaries into his pictures; made the first advance toward a naturalistic treatment of landscape in his backgrounds.

Graaf (gräf), **Regnier van**, 1641–73; Dutch anatomist; b. Schoonhoven, Netherlands; lived and practiced medicine mostly in Delft; gained wide reputation by his work, "On the Character and Use of the Pancreatic Juice," and by his discovery of the follicles or vesicles of the female ovum, since known as the Graafian vesicles.

Graal (grăl), or **Grail**. See SANGREAL.

Gracchus (grăk'ŭs), name of a Roman family of plebeian origin belonging to the gens SEMPRONIA. From the middle of the third century B.C. members of this family had attained distinction in war and in the state. CAIUS SEMPRONIUS, abt. 159–121 B.C., served with the army in Spain; became quæstor in Sardinia, 126–123; returned to Rome and was elected tribune; gained great popularity by securing laws to improve the condition of the poor; proposed extension of the Roman franchise to all Italy, but Livius Drusus, his colleage, vetoed the law; was sent to Carthage in charge of a colony; on return found that Drusus had supplanted him in popular favor; incited the populace to acts of violence, and, being hard pressed, commanded his servant to slay him. TIBERIUS SEMPRONIUS, abt. 210–abt. 158 B.C.; became tribune, 187; consul, 178 and 163; censor, 169; married Cornelia, daughter of Scipio Africanus; gained a victory over the Sardinians; brought about important political reforms; was the father of Tiberius and Caius, known as the Gracchi. TIBERIUS SEMPRONIUS, abt. 168–133 B.C.; son of the preceding; served in Africa under Scipio; became quæstor, 137; distinguished himself in the Numantian War; elected tribune, 134; proposed revival of law under which no man could hold more than 330 acres of land; framed modification of the law, but it was vetoed by the other tribune, M. Octavius Cæcina; subsequently Octavius was deposed and the agrarian law passed; seeking reëlection as tribune, Gracchus was accused of aspiring to be king; armed his followers, and was proceeding to clear the capitol when Scipio

Nasica, at the head of the senators, attacked his partisans, and killed 300 of them, as well as Gracchus himself.

Grace, Days of, in commerce, a certain number of days immediately following the day, specified on the face of a bill or note, on which it becomes due. Till the expiration of these days payment is not necessary. In Great Britain the days of grace are three, and were formerly the same in the U. S., but they have been abolished generally in bank operations. Payment of a bill within thirty days of its date is generally considered as a cash payment in large commercial transactions, and thirty to sixty days' time may be allowed for payment of life and fire insurance premiums.

Grace Notes, in music, certain short notes generally written in small characters, and introduced occasionally by way of ornament before some of the principal notes of a melody. The name is a very general one, referring to appoggiaturas, trills, turns, beats, half beats, springing notes, and similar embellishments, which are inserted for the purpose of developing or intensifying the effect of some particular notes in an air.

Graces, The, in Greek and Roman mythology, the female personifications of beauty and grace. Their names and number and their whole mythus are variously given. Hesiod makes them daughters of Zeus and Eurynome, and names them Euphrosyne, Aglaia, and Thalia. In art they were once represented as draped, but afterwards as nude figures, in the bloom of early youth.

Grack'le. See GRAKLE.

Grad'ual, in the office of the mass, that portion of Scripture which follows the Epistle and precedes the Gospel. It is generally a part of a psalm. The name is also given to the music, and to the book containing the music for the Gradual.

Gradua'tion, art of dividing astronomical, geodetical, and other mathematical instruments; was formerly done by hand with ordinary dividing instruments, and so few makers possessed the requisite skill that it was very difficult to procure good instruments for the ordinary purposes of navigation; but now the operation is performed with great exactness by machines called dividing engines. Jesse Ramsden constructed the first dividing engine, which was purchased by the English Govt., 1775. Modified and improved, the engine invented by him is still used. The principal feature is a large wheel of bell metal, the circumference being ratched into 720, 1,080, 1,440, 2,160, or 4,320 teeth, or any number which, divided by 2, 3, 4, 6, or 12, will give 360, turned by an endless screw. Movable microscopes and micrometers are also used.

Gra'dus ad Parnas'sum, meaning "a step to Parnassus"; work on prosody used in English schools in constructing Latin and Greek verse.

Gra'dy, Henry Woodfen, 1851–89; American journalist; b. Athens, Ga.; entered journalism after the close of the Civil War, and became editor and part proprietor of *The Constitution*, of Atlanta, 1880. In 1886 he delivered an address before the New England Society on "The New South," in which he displayed marked eloquence and oratory; and a few days before his death, in Atlanta, Ga., spoke before the Merchants' Association of Boston on "The Future of the Negro." These addresses were widely circulated, and caused him to be especially beloved in the S. states and highly esteemed in the N. A monument and a public hospital have been erected in Atlanta to his memory.

Grææ (grē'ē), three sisters of the Gorgons; daughters of Phorcys and Ceto, divinities of the sea. They had beautiful cheeks, were gray from their birth, and had but one eye and one tooth, which were used turn about. They were stationed as guardians of the road that led to the abode of the Gorgons and of the weapons that could slay the Gorgon Medusa. Perseus took their eye and tooth away as they slept, and refused to restore them until they pointed out to him the road to the Gorgons and gave him the deadly weapons. Their shining white *tooth* and their one *eye* are both symbols of the flaming lightning, as has been definitely proved by Roscher, and these sisters are naturally closely connected with the Gorgons.

Graf (gräf), title of nobility in Germany, corresponding to count in other countries; first mentioned in the fifth century; now of two grades, one including the highest and oldest nobility, the other the highest order of the secondary nobility.

Gräfe (grä'fē), **Albrecht von,** 1828–70; German oculist; b. Berlin; son of Karl Ferdinand von Gräfe; studied mathematics, the natural sciences, and medicine; became Prof. of Ophthalmolgy in the Univ. of Berlin; conducted a private establishment for the treatment of the eyes, and the periodical, *Archiv für Ophthalmologie*; and published many important papers on diseases of the eye and their treatment.

Graffiti (gräf-fē'tē), inscriptions found on ancient buildings and stones, chiefly in Italy. The fact that they are in the Latin, Greek, or old Italian languages proves their great antiquity. They are of rude and almost always intrinsically worthless character, and are evidently in many cases the work of idle scribblers. Except in the case of those found in the Catacombs, their antiquity confers on them the chief interest they possess. They are found in the substructures of Roman ruins; as, for instance, in the Golden House of Nero, the palace of the Cæsars, the Palatine, and in still greater numbers in Pompeii and in the Roman catacombs. They sometimes give striking glimpses of the mode of thinking and the manner of living in ancient times.

Graft, term of recent application in the U. S. to the custom of making or receiving a valuable consideration, usually in money, for a political, official, or business favor extended by one person to another. It differs from a

commission, expressed or implied, which is generally considered a legitimate transaction, in that it involves the probity of the parties concerned. Its worst application is in public official life, where it is at once an evidence of personal corruption and an answer to the very common question: "What is there in it for me?"

Graft'ing, the operation of inserting a bud or scion into a plant, or stock. A "bud" is a single bud cut from the side of a small twig and having little or no wood attached to it. A "scion" is a detached portion of a plant, bearing woody tissue and several buds. A stock is

Fig. 1.—Cleft-Graft Scion.

Fig. 2.—Cleft Grafting.

a plant or part of a plant upon which a scion or bud is set; in most cases it is a seedling plant of unknown or inferior merit in its fruit, flowers, or habit. The term grafting, in its broad sense, is held to include budding, or the insertion of single buds as defined above, and grafting proper, or the insertion of scions. Grafting or budding is employed for the propagation and perpetuation of nearly all the varieties of tree fruits, and it is used for many ornamental trees and shrubs. The common office of grafting is to perpetuate a variety which will not reproduce itself, or "come true," from seed, but in some species, which present no well-marked varieties, propagation is so slow or difficult from seeds or cuttings that they are grafted upon stocks of related species. Grafting is also employed for the purpose of producing some radical change in the plant, as in the dwarfing of trees by growing them upon slow-growing stocks, and the hastening of fruit bearing by setting scions in old plants. Grafting may be used to perpetuate a variety; to increase the ease and speed of multiplication; to produce some radical change in the habit or other character of the scion.

Fig. 3.—A Waxed Stub.

Fig. 4.—Shield Bud.

Fig. 5.—Preparing the Stock.

Grafting proper, or scion grafting, is usually performed in the winter or early spring, and the cut surfaces of both stock and scion are protected by a covering of wax. The scions are cut from dormant trees in winter and are stored until used in a cool cellar, or they are sometimes buried in a well-drained sandy place. The commonest style of grafting is that shown in the first three illustrations, and is known as cleft grafting, from the split or cleft which is made in the stock for the reception of the scions. The scion bears two or three buds, and is cut at its lower end into a wedge shape. The portion of the branch to be grafted is cut off squarely, and is split to a depth of an inch or two. This cleft is held open by means of a wedge, and a scion is inserted upon either side—care being taken that the inner barks of the scion and stock meet, and then the wax is applied. Budding, or bud grafting, is commonly done in late summer or early autumn, upon small stocks or branches, the bud usually being set upon wood that is not more than two years old. The bud shown in Fig. 4 is cut from the side of a recent twig in shield shape. The stock is then pre-

Fig. 6.—The Bud Tied.

pared by making a T-shaped incision (Fig. 5), into which the bud is slipped, and it is held in place by a binding of some soft string. Fig. 6 illustrates the method. Buds inserted in the late summer, after the common method of propagating fruit trees, remain dormant until the following spring, but the bandage must be removed in a week or two after the bud is inserted. See BUDDING.

Gra'ham, James Duncan, 1799–1865; American topographical engineer; b. Prince William Co., Va.; graduated at West Point, 1817; accompanied Major Long on his W. exploration, 1819–21; from 1838 to 1850 engaged as astronomer to determine the boundary between the U. S. and the republic of Texas, 1838–50; commissioner in survey of the NE. boundary of the U. S.; head of the scientific corps and principal astronomer to determine the boundary between the U. S. and the British provinces; on survey of "Mason's and Dixon's line," and of the boundary between the U. S. and Mexico; promoted to colonel of engineers, 1863.

Graham, John (Viscount Dundee and Lord Graham of Claverhouse), 1643–89; Scottish soldier; b. near Dundee; served in the French and Dutch armies, 1670–77; made captain of dragoons by Charles II, and sent into the W. Lowlands against the Covenanters; defeated at Drumclog, but victorious at Bothwell Bridge; obtained unenviable notoriety by his atrocities; was ennobled by James II, whose cause he supported against William III; at Killiecrankie Pass defeated William's troops, but fell himself.

Graham, Sylvester, 1794–1851; American reformer; b. Suffield, Conn.; became a Presbyterian preacher abt. 1826, and, 1830, took up the study of physiology and anatomy, afterwards lecturing throughout the country; maintained that correct habits of living and judicious diet were the cure for intemperance and diseases generally, and published an "Essay on Cholera," "Graham Lectures on the Science of Human Life," a "Lecture to Young Men on Chastity," and a treatise on "Bread and Bread Making." Bread made from unbolted flour still bears his name.

Graham, Thomas, 1805–69; Scottish chemist; b. Glasgow; was professor at the Andersonian Univ. in Glasgow, 1830–37, and at University College in London, 1837–55, and afterwards till his death master of the mint; conducted many physical and chemical investigations for the government; discovered the law of diffusion of gases; demonstrated the existence of a diffusive power in liquids resembling that in gases, which he called osmosis; expounded new theories on the composition of salts, and extended his researches to the transpirability of gases.

Gra'hamite, fossil form of asphalt occurring in Ritchie Co., W. Va., resembles some kinds of highly bituminous coal, having a slightly fibrous structure and resinous fracture, with a black or brownish-black color; was formerly used for the manufacture of oils and for an enricher of gas; also for roofing, for pavements, and as an electric insulator; now largely superseded by petroleum.

Grail, The Holy. See SANGREAL.

Grain, smallest measure of weight in use, about equal to that of a kernel of wheat. The present troy pound contains 5760 grains, and the avoirdupois pound 7,000.

Grain Coast, former name of the coast of what is now Liberia, Africa, so named from the cardamom or grain of paradise, formerly an important article of trade in that region.

Grain. See CEREALIA.

Grain El'evators, buildings designed for the storage, transfer, and handling of cereals. With the grain elevator 30,000 bush. of grain can be transferred from a vessel to cars or canal boats in an hour. A modern grain elevator is a high structure with two or three unloading towers on the water front, one being stationary and built in the middle with the movable towers on either side. The main house which holds the grain is built upon a pile and stone foundation. The first story contains the posts which hold up the superstructure and all the discharge spouts. The bin work rests upon timbers which are laid on and fastened to the supporting columns. The machinery floor is on top of the bins, in which part of the building are placed the shafting and gearing for driving the machinery in the elevator. On the front of each unloading tower is a projection with an opening for operating the marine leg, which is a long double box that admits cups or buckets fastened to an endless rubber belt. The bucket in going up maintains an upright position till it reaches the top of the pulley, over which it runs and discharges its contents, and reverses itself in going down. A barge or vessel in coming to be unloaded moors at the dock with her middle hatch placed opposite the stationary tower, the unloading leg of which is then dropped into the grain in the vessel and elevating begins. The other towers are moved opposite the hatches of the vessel, and their legs also are lowered into the grain, which is drawn to the legs by means of steam shovels. The grain flows through openings in the foot of the leg to the buckets and is elevated to a large receiver built in the tower into which the grain is admitted. From the receiver the grain is drawn into a hopper, weighed, and dropped to the foot of the lofter or distributing legs in the main house, when it is again elevated and spouted into store through spouts arranged at the heads of the inside legs.

Grakle (grāk"l), any one of several birds of the starling family, such as the paradise grakle and the mina bird, natives of India; in the U. S. name given to various birds of the family *Icteridæ*, the most familiar being the purple grakle or crow blackbird. The boat-

tailed grakle, known locally as the jackdaw, is a larger bird found in the S. Atlantic and

PURPLE GRAKLE.
1. Female. 2. Male.

Gulf states. The rusty grakle is a smaller bird with a range from the E. U. S. to Alaska.

Grallæ (grăl'lē), name applied to various groups of wading birds on account of their long, stiltlike legs. The group is very hard to define, and its members are generally distributed in several groups or orders.

Gramineæ (grā-mĭn'ē-ē). See GRASSES.

Gram'mar, science of the phenomena of language. When the basis of arrangement is the form and relation which these phenomena present in actual use, the science is called *descriptive* grammar. When the basis is their relation to an order of historical development, the science is called *historical* grammar. When the basis is their relation to the general principles which govern the rise and growth of language in general, the science is called *general* or *philosophical* grammar. Grammar is not only a science, but an art, inasmuch as it offers a systematic guide to correct usage. It was called an art (τέχνη) by many of the early Greek grammarians. It conformed reasonably to Aristotle's definition of an art as "methodical skill with practical adaptation," τέχνη ἐστὶν ἕξις δοῦ ὁτοῦ συμφέροντος ποιητική. Grammar as taught in the common schools is preëminently an art. Its chief aim is by methodical instruction to establish and maintain correct standards of native speech.

The impulse of a grammatical science appears independently among but few of the peoples of early history. The necessity of perpetuating the knowledge of the language and literary monuments of the Sumero-Accadian civilization which they had inherited caused the Assyrians to construct vocabularies, syllabaries, translations, and systems of paradigms of this language. The Egyptians invented methods of recording words and then sounds. The Chinese developed, in the study of their ancient literature, a science of textual criticism and of lexicography, though the impulses to grammatical work in the proper sense unquestionably came first from India, as was also the case in Japan. The only two peoples, however, who independently developed complete grammatical systems were the Hindus and the Greeks, and it is upon the foundations laid by them that the entire structure of modern grammatical science rests. The beginnings of Greek grammar are found in the works of the philosophers. Aristotle partly identified and defined the parts of speech, and the Stoics added to his results, but the essential work of constructing a grammatical system lay with the professional grammarians who, from the third century B.C. onward, are found in connection with the Macedonian courts of Pergamon or Alexandria, or in the schools of Athens or Rhodes. At Alexandria, especially, there assembled about the great library founded by Ptolemy Philadelphus II a notable body and succession of grammarians. Among the early grammarians was Dionysius Thrax, whose handbook of grammar became the basis for all the Greek grammars down almost to modern times, and determined the traditions of school grammar for the entire Occident. Among the Romans the science of grammar was left largely to Greek scholars, many of whom, like Didymus, Apollonius Dyscolus, and Herodian, found in Rome an appreciative reception. Of the native grammarians, M. Terentius Varro, a contemporary of Cicero, occupies the first position by reason of the value of his reports concerning the materials of the older Latin and the Italic dialects.

The traditional descriptive grammar generally divides itself under four main heads—orthography, etymology, syntax, and prosody. Orthography deals with sounds and their symbols, letters, and with the grouping of these into syllables and words. In the modern historical grammar this is replaced by phonetics, or the physiology of sounds, phonology, or the history and relation of sounds, and the history of writing with its special disciplines, epigraphy and paleography. Etymology treats of the parts of speech and their inflections, and in historical grammar is replaced by the historical study of inflections or accidence and of word formation, including composition and derivation (suffixes and prefixes). Syntax treats of the arrangement of words into sentences according to the functions expressed in their form. The modern historical syntax seeks to show how the functions expressed by form and the types of construction in sentences are historically conditioned and developed. Prosody treats of the laws of versification as related to the quantity and accent of syllables. See ETYMOLOGY; PROSODY; RHETORIC; SYNTAX.

Gramme, French unit of weight, equal to 15.4325 grains troy, or very nearly $\frac{1}{4}\frac{1}{1}$ of a dram avoirdupois. It is the weight of a cubic centimeter of distilled water at the temperature of maximum density, 4° C., or 39.2° F.

Its multiples by 100 are successively deca-, hecto-, kilo-, and myriagrammes. The weight of the kilogramme or 1,000 grammes, is equal to 2.2046 lbs. avoirdupois.

Grammont (grăm-môń'), **Or'der of,** an order of monastics established at Muret, near Limoges, France, 1073, by Stephen of Thiers, who wore a shirt of steel rings and slept in a coffin. He took the title of corrector. Gregory VII imposed the rule of St. Benedict. In 1124, after Stephen's death, the order was removed to Grandmont, whence it took its name. It had a verbal or traditional rule, derived from its founder and afterwards reduced to writing. The Grandmontains, as they were also called, were afterwards very numerous and much respected. The order perished at the time of the French Revolution, having degenerated.

Gramont (grä-môń'), **Antoine Agénar Alfred** (Duc de), 1819–80; French statesman; b. Paris; ambassador at Vienna, 1861–70; then entered the Ollivier cabinet as Minister of Foreign Affairs. After the withdrawal of the candidacy of Prince Leopold of Hohenzollern, Gramont insisted that the King of Prussia should promise that no prince of his house should become a candidate for the throne of Spain; and, July 15th, he officially announced war between France and Prussia. On the fall of the Ollivier ministry, August 9, 1870, he retired to private life; published "La France et la Prusse avant la Guerre."

Gramophone (grăm'ō-fōn). See PHONOGRAPH.

Gram'pian Hills, a range or system of mounains which traverse Scotland from NE. to SW., from the Atlantic to the North Sea, and form the highlands of Aberdeen, Kincardine, Forfar, and Perth; highest point, Ben Nevis, 4,406 ft.; general height is from 2,000 to 3,000 ft.; toward the N. the Grampians send forth ranges of wild mountains, forming extensive highlands; toward the S. they slope more gently.

Grampians, range of mountains in the W. part of Victoria, Australia, stretching from N. to S. in a curve around the basin of Glenelg and its affluents; highest peak, 5,600 ft. above the sea.

Gram'pus, popular name for almost any good-sized cetacean; applied not only to such

GRAMPUS ORCA.

forms as the blackfish and killer (*Orca*), but to some of the smaller finback whales. Strictly speaking, it belongs to the members of the genus *Grampus*, a division of the blackfish family, distinguished by having no teeth in the upper jaw, and but few (four to fourteen) in the front portion of the lower jaw. The best known species, the gray grampus, is slaty gray, mottled and streaked, about 8 or 10 ft. long, and is found in the N. Pacific, N. Atlantic, and the Mediterranean.

Gran (grän), town of Hungary; on the Danube; 25 m. NW. of Budapest; is one of the oldest towns of Hungary, being the birthplace and residence of St. Stephen, the first king, and is still a handsome and lively place; is the See of the Primate of all Hungary, an archbishop of the Latin rite, and has a most beautiful though yet unfinished cathedral; trade in wine is considerable. Pop. (1901) 17,909.

Granada (grä-nä'-dä), ancient kingdom of Spain, in Andalusia; now comprising the three provinces of Malaga, Granada, and Almeria; bounded S. and E. by the Mediterranean; greatest length about 200 m., greatest breadth about 80 m.; area, 11,100 sq. m.; pop. of the three provinces (1900) 1,363,462. The Sierra Nevada mountains traverse it from E. to W.; one of them, the Cerro de Mulhacen, 11,654 ft. above the sea, is the highest mountain in Spain. The principal rivers are the Jenil, Almanzora, and Guadalorze. Agriculture is the chief business. The principal manufacture is silk. Granada formed an opulent, civilized, and powerful kingdom under a Moorish dynasty, founded 1238, which was overthrown by Ferdinand the Catholic, 1492.

Granada, city of Spain; capital of province of same name; on two declivities of the Sierra Nevada and on the plain between them, 34 m. from the Mediterranean, and 224 m. S. of Madrid; pop. (1900) 75,900. The river Darro flows through it, and falls into the Jenil just outside the walls. The site of the city is about 2,000 ft. above the sea, and its appearance is singularly picturesque. It is divided into the city proper, the Alhambra suburb, the Albaycin suburb, and the Antequeruela suburb. The streets are narrow and crooked, but the houses are well built in antique Oriental style. It contains remarkable churches and palaces, and a university. Chief among the monuments of its former splendor is the Alhambra, or ancient palace of the Moorish kings. Granada was founded by the Moors in the tenth century, and from 1238 was the capital of the Kingdom of Granada till the beginning of 1492, when it was taken by Ferdinand and Isabella after a protracted siege. At the height of its splendor it is said to have contained 500,000 inhabitants.

Granada, New. See COLOMBIA.

Granadilla (grăn-ä-dĭl'lä), fruit of several tropical species of passion flower. The great granadilla is the fragrant, gratefully subacid fruit of *Passiflora quadrangularis*, whose root is emetic and narcotic. *P. laurifolia* (watermelon), *P. maliformis* (sweet calabash), *filamentosa, edulis,* and many other species bear edible fruits. They are all natives of America.

Gran'ary of Eu'rope, term applied by the ancients to the island of Sicily because of its agricultural productiveness.

Gran'by, John Manners (Marquis of), 1721–70; English general; b. England; eldest son of the Duke of Rutland; was educated at Eton and Cambridge; raised a foot regiment, 1745; elected to Parliament, 1754, 1761, and 1768; became colonel of the Horse Guards, 1758; lieutenant general, 1759, and distinguished himself at the battle of Minden; commanded the British troops in the Seven Years' War, 1760–63; was distinguished at Warburg, 1760; Kirchdenken, 1761; Gräbenstein and Homburg, 1762; became master general of ordnance, 1763; had chief command of the British army, 1766–70.

Gran Chaco (grän chä'kō), region in S. America embracing all the land W. of the Paraguay and N. of the Salado to the highlands of NW. Argentina and Bolivia, and N. to about lat. 17° 30′ S.; it thus includes the NE. part of Argentina, the SE. part of Bolivia, W. Paraguay, and a very small strip of Brazil, the total area being not less than 325,000 sq. m. Formerly the name was extended to NE. Bolivia as far as the Guapré and Beni, which would add nearly 200,000 sq. m. to the estimate. Excluding this N. region, the Chaco is a vast plain, in parts perfectly flat, elsewhere slightly rolling, the whole with a very gentle slope to the SE.; in the N. part there are some isolated hills, and W. the plain is broken by spurs from the highlands; but the general surface is nowhere more than a few hundred feet above sea level. The great rivers Pilcomayo, Bermejo, and Salado cross it in a SE. direction; they have very tortuous courses, and break up into a network of channels before reaching the Paraguay. The Bolivian Govt. has long been seeking for a practicable route across the Chaco to the Paraguay, and military expeditions from Argentina have penetrated it with the view of preparing a way for settlement. Civilization is slowly extending N. across the Salado; civilized population, abt. 5,000.

Grand Ar'my of the Repub'lic, fraternal, charitable, and patriotic association composed exclusively of soldiers and sailors of the U. S. army, navy, and marine corps who served during the Civil War of 1861–65, and were honorably discharged. No person is eligible to membership who has at any time borne arms against the U. S. B. F. Stephenson, M.D., who served as surgeon of the Fourteenth Illinois Infantry, was the founder of the order. The first "general orders" were issued April 1, 1866, and the first charter for a post was granted April 6, 1866. Membership (1907) 225,157, divided among about 6,000 posts in forty-five departments.

Grand Bank, subaqueous plateau in the N. Atlantic which extends E. from Newfoundland toward Europe; is triangular in form, with the base on Newfoundland and the apex 450 m. SE.; width of triangle slightly less than the height. Its existence is believed to be largely due to the melting of icebergs by the warm waters of the Gulf Stream. The icebergs bring much gravel, earth, and stone from the glaciers of Greenland, and as they melt this matter is deposited on the sea bottom. The Grand Bank is the most extensive and important known resort of the codfish, and is visited by many fishing vessels from France and Great Britain and their colonies and from the U. S.

Grand Canal', principal waterway of Venice; follows a tortuous course through the city; has beautiful buildings on its banks. Also the name of an important waterway of China believed to have been constructed by Kublai Khan the first emperor of the Yuen or Mongol dynasty, which ruled in China, 1280–1368 A.D. It extends from the city of Hangchow in the province of Cheh-kiang N. to Pekin, the capital, a distance of over 650 m., and is called by the Chinese Yun-ho (Transport River), or Yun-liang-Ho (Grain-transport River), from the fact of its having been constructed for the purpose of connecting the great rice-producing provinces of the S. with the capital. It crosses the Yang-tse, the Hwang-ho, and other rivers, and until recent years formed part of an inland system of water communication by which almost any part of the country could be reached from the capital. The part of the canal which lies between the Yellow River and the Yang-tse is said to have been constructed more than 500 years before our era, and the part between the Yang-tse and Hangchow about the beginning of the seventh century A.D.

Grand Coutumier (grän cō-tū-mī-ā'), either of two collections of ancient French laws. One, known also as the "Coutumier de France," is a collection of the customs, usages, and forms of practice which had been in use from time immemorial in the Kingdom of France. The work was first planned by Charles VII, 1453, but was not finished until 1609. The other collection, designated as the "Coutumier de Normandie," embodies the laws and customs of Normandy, and is much more ancient, having been made about the year 1229, in the reign of Henry III of England.

Grand Days, days of social festivity appointed by the English Benchers for the entertainment of judges, barristers, and students of the Inns. These were formerly great occasions, and were celebrated four times a year with much revelry.

Grandee (grän-dē'), highest rank of Spanish nobility. The grandees of Spain were the great nobles descended from the ancient chief feudatories of the crown, and from members of the royal family. They considered themselves superior in rank to all the other nobility of Europe, and second only to princes of royal blood. Many of them had no title; others had the titles of count, marquis, and duke, and some possessed enormous estates. Among the richest were the dukes of Medina-Celi, Alva, Ossuna, Altamira, Infantado, and Arcos. The grandees have no privileges now.

Grand Ju'ry, a jury whose province it is to determine whether indictments shall be brought against alleged criminals; so called from its size, as distinguished from a petit, or small, jury. The custom of making the trial of any person for a crime depend entirely on the decision of his fellow citizens is ancient in English history; and its importance as a safeguard of civil liberty has caused its scrupulous maintenance. In the U. S. provisions have been inserted in the national constitution, and, for the most part, in the state constitutions as well, prohibiting criminal prosecutions for all but an inferior class of offenses, or such as occur among the military or naval forces, except on the presentment or indictment of a grand jury. See TRIAL.

Grand Manan (măn-ăn'), island in the Bay of Fundy, belonging to Charlotte Co., N. B.; is 22 m. long, and from 3 to 6 m. in breadth; is fertile and well timbered, and its coast abounds in good harbors. The herring, haddock, and cod fisheries are important. Grand Harbor is the principal settlement. The island is a favorite summer resort. Pop. 3,000.

Grand Monad'nock, or **Monadnock,** isolated mountain peak in Jaffrey township, Cheshire Co., N. H.; is 3,718 ft. high, and visible for many miles in every direction; is regarded as an outlying member of the White Mountain group.

Grand Pen'sionary, or **State Pensionary,** state secretary for the province of Holland during the republic of the United Netherlands; was originally also advocate general for the same province; in later times was, by virtue of his position, an official of the States-General, a kind of premier in that body; term of office was five years. The syndic, or paid counselor, of any important Dutch town was called a pensionary.

Grandpré (grăń-prā'), **Louis Marie Joseph Ohier** (Comte de), 1761–1846; French navigator; b. St.-Malo; after a long mercantile experience at sea, served fifteen years in the navy; author of "Voyage to India and Bengal, made in 1789–90"; "Voyage to the Western Coast of Africa," in which he gives an account of the Kongo slave trade; and "Universal Dictionary of Maritime Geography."

Grand Pré, village on the Basin of Minas, Horton township, Kings Co., Nova Scotia; 15 m. from Windsor; the scene of Longfellow's "Evangeline"; was settled by the French under De Monts, 1604, but passed with the rest of the province of Nova Scotia into the hands of the British, 1713. The expulsion of the Acadian colonists, however, did not occur till 1755. The Pré is a fertile tract of diked land; area, 10 sq. m.

Grand Prix (-prē'), horse race for three-year-olds, run at Longchamps, France, on the Sunday of Ascot week; established by Napoleon III; prize, 20,000 fr.

Grand Rap'ids, capital of Kent Co., Mich., on the Grand River, at the head of navigation, and on a dozen railroad lines; 60 m. NW. of Lansing; is the second city in the state in population and commercial importance; has steamer communication with Chicago, Milwaukee, and principal lake ports; is locally known as the "Furniture City." The fall of the river here affords excellent power for manufacturing, and this industry, 1900, was represented by a capital investment of $25,915,861, and an output valued at $31,032,589, largely furniture, glass, brass goods, bicycles, felt, carpets, lamps, stoves, and chinaware. A natural resource of the city is one of the most productive gypsum quarries in the world. The city contains the Michigan State Soldiers' and Sailors' Home, the Butterworth, Masonic, Roman Catholic, and Union Benevolent homes, attractive federal, county, and municipal buildings, St. Cecilia and Peninsular clubhouses, and numerous churches and public schools. The assessed property valuation exceeds $77,000,000; bonded debt, less than $3,000,000. Pop. (1904) 95,718.

Grand Remon'strance, document drawn up by the English House of Commons in 1641, and presented to Charles I, protesting against many acts of tyranny such as the extortion of ship money, forced loans, the billeting of soldiers upon the people, the creation of monopolies, etc. The king seemed incapable of realizing the serious condition to which affairs were drifting and returned a haughty "Answer" to the petition annexed to the Remonstrance.

Grand Riv'er, (1) a tributary of Lake Michigan; formed by the union of various streams in the S. peninsula of Michigan. At its mouth is Grand Haven. The river is navigable 40 m. to Grand Rapids, and boats ply on it 50 m. above that point. (2) An affluent of the Missouri River. Its head streams rise in Iowa. With its numerous forks it drains a large part of N. Missouri. Its mouth is at Brunswick in Chariton Co.

Grand Trav'erse Bay, in Michigan; a S. extension of Lake Michigan; its S. part is divided by Preogenise Point into the E. and W. arms.

Grange, primarily a granary; then the outhouses of a farm, its stables, etc.; also an isolated farmhouse of the better class, a sort of semicastle, as The Grange, Suffolk Grange, La Grange. In 1867 the term was selected by the order of Patrons of Husbandry as the designation of its national, state, and subordinate organizations. See PATRONS OF HUSBANDRY.

Granicus (grā-nī'kŭs), ancient name of the Khodja Su, a small river in Mysia which rises on Cotylos, a peak of Mt. Ida, and empties into the Sea of Marmora, near Priapus. Here Alexander the Great won his first victory over the Persians, 334 B.C., and here, too, Lucullus was victorious over Mithridates.

Granier de Cassagnac (grā-nē-ā' dė kā-sān-yäk'), **Adolphe,** 1806–80; French journalist; b. Bergelles, Gers; went to Paris, 1832; became one of the editors of the *Journal des Débats*

and the *Revue de Paris*; advocated the maintenance of slavery in the French colonies, and started many papers in Paris. In 1852 was elected to the Corps Législatif, of which he remained a member until the fall of the empire; was chief editor of *Le Pays*, an imperialist paper; wrote a "History of the Laboring and Bourgeois Classes," "History of the Causes of the Revolution," "History of the Origin of the French Language," and other works.

Granier de Cassagnac, Paul Adolphe Marie Prosper, 1843–1904; French journalist; b. Paris; son of the preceding; entered journalism when nineteen; became a polemist of high order, a zealous imperialist legislator and editor, and a noted duellist by reason of the enemies he made with his pen; associated with his father in authorship of histories of Napoleon III and of the Third Empire.

Gran'ite, hard, firm rock, made up essentially of crystalline grains of feldspar and quartz, deriving its name from its granular structure. The typical granites are generally described as composed of a potash feldspar (orthoclase), quartz, and mica; but there are similar rocks which entirely lack the mica, and others in which it is replaced by hornblende. This latter combination is sometimes called syenite, but this term appears to have been originally employed to designate a rock composed of hornblende with a soda feldspar (albite, oligoclase, or labradorite), and without quartz, being identical with what is called diorite. It seems better, therefore, to follow the example of certain German lithologists, who define granite as a binary aggregate of orthoclase feldspar and quartz, in which mica and hornblende may be present as accidental minerals, giving rise to micaceous and hornblende granite, while the variety from which they are both absent is termed normal or binary granite. There is a popular notion that granite is the oldest of all rocks, and the substratum which underlies all others; but it is in fact of all ages, some of it comparatively modern. Granite is called a plutonic rock, but most granites are metamorphic, and have passed from their sedimentary to a crystalline structure from long-continued heat, not necessarily great. A beautiful red granite is brought to the U. S. for monuments from Peterhead, near Aberdeen, Scotland. It is composed of red orthoclase, albite, black mica, and quartz, and is of very compact and homogeneous texture. Granite is regarded as the strongest of building stones, although much of the granite of commerce is syenite or syenitic gneiss. The output in the U. S., 1905, amounted in value to $20,637,693, the chief producing states being Maine, $2,713,795; Massachusetts, $2,663,329; Vermont, $2,571,850; California, $1,700,818; Georgia, $971,207; Maryland, $957,048; Connecticut, $949,888; and Pennsylvania, $870,848. See BUILDING STONE.

Grant, Anne (MACVICAR), 1755–1836; Scottish author; b. Glasgow; daughter of a British army officer, whose estate in Vermont (where she for some years lived) was confiscated during the Revolution; married, 1779, the Rev. Mr. Grant, of Loggan; wrote "The Highlanders," a volume of verse; "Memoirs of an American Lady" (Mrs. Schuyler, of Albany); "On the Superstitions of the Highlanders," etc.

Grant, Sir Francis, 1804–78; Scottish portrait painter; b. Kilgraston; relinquished the law for painting abt. 1828. He was first known as a painter of hunting scenes; began to paint portraits abt. 1840, and exhibited an equestrian portrait of the queen, 1841; Royal Academician, 1851, and president, 1866, when he was knighted; was the fashionable portrait painter of his time.

Grant, George Monro, 1835–1902; Canadian educator; b. Albion Mines, Nova Scotia; was ordained a Presbyterian minister; settled as pastor at Georgetown, Prince Edward Island, 1861; removed to Halifax, Nova Scotia, 1863, and was pastor of St. Matthew's Church there till 1877, when appointed principal of Queen's Univ., Kingston; was also Primarius Prof. of Theology, and achieved distinction as a lecturer; wrote "Ocean to Ocean Through Canada" and "Picturesque Canada."

Grant, Sir James Hope, 1808–75; British military officer; b. Kilgraston, Scotland; commanded the cavalry at the siege of Delhi, the relief of Lucknow, and the subsequent operations at Cawnpur; also the British forces in the China campaign terminating with the capture of Pekin, for which he received the thanks of Parliament; commander in chief in Madras, 1861–65, as lieutenant general; promoted general, 1872; author of "Incidents of the Sepoy War" and "Incidents in the China War of 1860."

Grant, Ulysses Simpson, 1822–85; U. S. military officer and eighteenth President of the U. S.; b. Point Pleasant, Clermont Co., Ohio; graduated at West Point, 1843; served through the Mexican War and reached the grade of captain; resigned, 1854; engaged in farming near St. Louis till 1860, when he entered the leather trade with his father at Galena, Ill.; was appointed colonel of the Twenty-first Illinois Infantry, July 17, 1861, and proceeded to Missouri; commissioned brigadier general of volunteers, August 7th; was placed in command of the District of SE. Missouri, September 1st; seized Paducah, Ky.; broke up a Confederate camp at Belmont, November 7th; besieged Fort Donelson, on the Cumberland River, Tennessee, which surrendered, February 16, 1862; was promoted major general of volunteers and placed in command of the District of W. Tennessee; won the battle of Shiloh, April 6th–7th (Federal loss, 13,047; Confederate, still greater). After commanding the right wing and reserve under Halleck, April 8th–July 11th, Grant succeeded the latter, October 25th, in command of the Department of the Tennessee, having meantime, September 19th, won the incomplete victory of Iuka, Miss.; directed the operations which resulted in the repulse of the Confederates from Corinth; marched on Vicksburg, Miss.; in January,

1863, took command of all the troops in the Mississippi Valley; defeated Pemberton at Port Gibson, May 1st; won the battle of Raymond, May 12th; captured Jackson and scattered Johnston's army, May 14th; routed Pemberton at Champion Hill, May 16th, and at Black River Bridge, May 17th; assaulted Vicksburg unsuccessfully, May 19th–22d; received the surrender of the city with 31,600 men and 172 cannon, July 4th.

Grant was made a major general in the regular army, October 16th, and given command of the Military Division of the Mississippi; directed the battle of Lookout Mountain which saved Chattanooga from capture, October 27th; fought the battle of Chattanooga, November 23d–25th, utterly routing Bragg and overthrowing the last hostile force W. of the Alleghanies. He was made lieutenant general, a rank created for him by Congress, March 2, 1864; assumed command of the armies of the U. S., March 17th, and prepared to encounter the army of N. Virginia under Lee. He began his march from the Rapidan to the James, opposing 110,000 men to Lee's 75,000; fought May 5th–June 3d, the battles of the Wilderness, Spottsylvania, North Anna, and Cold Harbor, losing 6,000 killed, 26,000 wounded, and nearly 7,000 missing; in June, with 110,000 men, began the siege of Petersburg and Richmond; entered those cities, evacuated by the Confederates, April 3, 1865; pursued, and at Appomattox Courthouse surrounded, Lee, who, April 9th, surrendered with 27,000 men, all that remained of his army. He then returned to Washington to disband his armies.

Grant, July 25, 1866, was commissioned general, a grade created for him by Congress; was appointed Secretary of War *ad interim*, August 12, 1867, but resigned, January 14, 1868, in consequence of differences with President Johnson; was elected President of the U. S., 1868, carrying 26 states with a popular vote of 3,015,071, Horatio Seymour, Democrat, receiving 2,709,613; in spite of violent opposition in his own party, was reëlected, 1872, carrying 31 states with a popular vote of 3,597,070, Horace Greeley carrying six states with a popular vote of 2,834,079; made a tour of the world, 1877–79; was an unsuccessful candidate for the presidential nomination, 1880; was made general on the retired list, March 4, 1885; wrote his "Personal Memoirs"; died at Mt. McGregor, 11 m. N of Saratoga, N. Y., July 23d, and was entombed in Riverside Park, New York City, where a magnificent mausoleum was afterwards erected for his remains and those of his wife.

Grant, word used in deeds of conveyance, formerly with a specific meaning that now is almost lost. By the early common law there were interests which could not be transferred by livery of seizin, as rents, reversions, remainders, and generally all mere rights and incorporeal hereditaments. These could be transferred only by deeds containing the proper words of transfer, of which the principal was *concedo*, "grant." The distinction between livery and grant has become unimportant, for in conveying any interest in land it is now customary to use the word "grant" in the deed.

Gran'ta. See CAM.

Granvelle (grăn-vĕl'), **or Granvel'la, Antoine de Perrenot,** 1517–86; Spanish ecclesiastic and statesman; b. Ornans, Burgundy; appointed Bishop of Arras, 1540; became a state councilor under Charles V; 1550, took the chancellorship of the empire; negotiated the Treaty of Passau, 1552; arranged the marriage between Philip II and Mary of England, 1553. He concluded the Treaty of Cateau-Cambrésis, 1559; was minister to the Duchess of Parma in the Low Countries, 1559–64; became Archbishop of Mechlin, 1560; Cardinal, 1561; and, 1564, retired to Besançon, compelled to leave his office by the clamors of nobles and people; afterwards was Spanish envoy to Rome, 1570; Viceroy of Naples, 1570–75; president of the supreme council of Italy and Castile, 1575; translated to the archbishopric of Besançon, 1584.

Gran'ville, George (Viscount Lansdowne, Baron of Bideford), 1667–1735; English poet, dramatist, and politician; educated at Trinity College, Cambridge; kept aloof from politics during the reign of William and Mary on account of his sympathy for the Stuarts; wrote "Heroic Love," "British Enchanters," and other dramas, besides poems; entered Parliament, 1710, and was in the same year appointed Secretary of War. His connections with the Pretender, however, were so well known that after the death of Anne he was for two years confined in the Tower, 1714–15, and, 1722, saw fit to retire to France, where he lived for ten years.

Granville, John Carteret (Earl), 1690–1763; British statesman; entered the House of Lords in 1711 as second Baron Carteret. As ambassador extraordinary to Sweden, and later as Foreign Secretary, he proved himself a skilled diplomatist, and in 1724 was appointed Lord Lieutenant of Ireland. On his return he led the party that overthrew Sir Robert Walpole, and as Secretary of the State for the N. Department was the real head of the administration till its overthrow by the Pelhams in 1744. In the same year he became Earl Granville. Henry Pelham made him lord president of the council in 1751, but he was never again a party leader.

Grape, fruit of woody vines of the genus *Vitis* (the ancient Latin name), the type of the order *Vitaceæ*. Grapes are found in the temperate climates of both hemispheres. There is at present some confusion about the species, but in a horticultural view they are divided into European and American grapes. The European grape, *V. vinifera*, is the species that in some of its varieties is cultivated in most European and Asiatic countries. The foreign vine is distinguished from American species principally by the character of the fruit; in the latter the seeds are enveloped and held together by a more or less firm pulp, which slips from the skin, while a foreign grape may be broken open with the pulp still adhering

to the skin, and the seeds so free from it that they will fall out or may be readily separated. The cultivation of the foreign grape under glass is followed to a considerable extent both as a matter of luxury and of profit. Of American species of genus *Vitis* producing edible fruit, botanists recognize four: *V. labrusca*, the N. Fox grape; *V. æstivalis*, the Summer

1. 2. 3.

FLOWER OF THE GRAPE.

1. Young flower. 2. Vertical section. 3. Flower without corolla.

grape; *V. cordifolia*, the Frost grape; and *V. vulpina*, the Muscadine or S. Fox grape.

In no branch of fruit culture has there been greater progress than in the cultivation of American grapes. Sixty years ago the Catawba and Isabella were the only kinds grown to any extent, while at the present time the varieties are numbered by hundreds, and additions are yearly made to the list. Grape training depends upon the fact that fruit is borne upon wood of the current year's growth. It must be modified according to the conditions under which the grapes are grown, but its object is the same for all species—to curtail growth so that the vine will not become un-

EUROPEAN GRAPE.

manageable, to thin the fruit, to increase productiveness, and to allow the sun to reach the berries. American vines cannot be pruned as closely as the European species, but the wine grape can be pruned even more severely than other kinds. The canes or ripened shoots of any season are cut back to from two to five buds. If each successive year's growth is so cut, the bearing wood must be constantly removing itself from the root or crown of the plant. To keep the wood near the stock, a new cane is often trained up from the root to ultimately displace the old plant. The European vine can stand alone, and is so reared in California. But the American species are commonly trained upon a trellis, the shoots being either tied perpendicularly to the wires or allowed to hang over them.

Grapes demand a well-drained, warm, and gravelly soil, and a location free from late spring and early fall frosts. Proximity to bodies of water aids to mollify the temperature. The vines are set 6 to 8 ft. apart. They are propagated from cuttings of hardwood taken in the fall and stored until spring in a cool cellar or buried in a gravelly place. Rare varieties may be started under glass from cuttings of "eye" or single buds. Grafts take well, but the scion should be put in below the ground, or it will be broken by the wind. The grape is subject to many diseases and insects, of which the worst probably is the phylloxera. The downy mildew is a fungous disease affecting the leaves and the fruit, causing the latter to rot. The mildew of Europe is a different disease from this; the American, or downy, mildew is common in Europe, however. The black rot, also an American disease, causes a serious shriveling and decay of the fruit. Of the numerous insects peculiar to the grape and allied plants, the so-called thrip, or leaf-hopper, is almost as serious as the phylloxera. This is a minute insect feeding on the leaves. The rose-chafer is also a serious pest, especially on light soils, but no good remedy beyond hand picking is known.

Over 500 varieties of grapes indigenous to the U. S. are described. The most popular kinds are Concord, Worden, Niagara, Catawba, Delaware, Champion, Brighton, Moore's Early, Pocklington, Lady, Cynthiana, Norton's Virginia, Herbemont, Ives, Lady Washington, Martha, the Rogers hybrids, and others for special localities. For graperies under glass the following are popular: Black Hamburg, White Frontignan, Muscat of Alexandria, Chasselas, St. Peter's, Black Prince. In the production of table grapes, New York leads, followed by Ohio. The grape interest in Ontario is also large. The vast Pacific vine area is planted with the true wine grape of the Old World. In Europe, the vine is extensively cultivated, especially in France and Germany, but in some countries, particularly in Greece and the Ionian Islands, raisins form the chief part of the produce of the vineyards. The systematic administration of grapes, or of certain parts of them, in large quantities, for the relief of disease, is carried out in Germany, Austria, Hungary, and Switzerland.

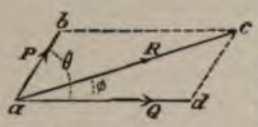
Grape Fam'ily. See VINE FAMILY.

Grape'fruit (*Citrus decumana*), fruit also known as the pomelo, pompelmos, or shaddock; cultivated in Florida, California, and many tropical countries. It is called grapefruit because its flavor is supposed to resemble that of the grape. The round fruit is of higher commercial value than the pear-shaped kind.

Grape'shot, several kinds of artillery missiles, but especially a cluster of iron balls grouped about a spindle, and held in place by iron disks, through which the spindle passes. Formerly the balls were quilted into a bag, looking like a bunch of grapes. Grapeshot is very effective against infantry in masses at short range.

Grape Sug'ar. See GLUCOSE.

Graph'ic Stat'ics, branch of mechanics in which statical problems are solved by means of simple geometric constructions. The forces are represented by lines drawn to scale, and by operating on them the draughtsman deduces other lines which furnish the solution of the particular problem before him. Graphic statics is founded upon the principle of the parallelogram of forces. The resultant R of the forces P and Q being represented in direction and intensity by the diagonal *a.c.* of the parallelogram *a b c d*, the directions and intensities of the three forces are shown by the sides of the triangle *a b c*, and, passing around the triangle from *a* to *b*, *b* to *c*, and *c* to *a*, the direction of each force is that necessary for equilibrium. This leads to the principle of the triangle of forces by which are solved such problems as the position of the center of gravity and movements of inertia of bodies, as well as the stability of arches, beams, and bridges. Graphic statics, as a special instrument for investigations in engineering, may be said to date from 1866, although a few special applications had been made by Poucelet and Cousinery as early as 1840.



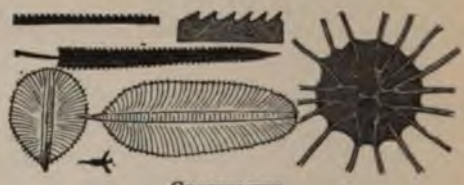
GRAPHIC STATICS.

Graph'ite, mineral commonly called black lead or plumbago, which titles are misleading, as it contains no lead. Its composition is similar to that of anthracite coal, from ninety to ninety-five per cent of carbon, with from four to ten per cent of iron, and traces of silica, alumina, lime, and magnesia. It occurs in beds and sheets, in granite, gneiss, mica schist, and crystalline limestone. It is sometimes the result of alteration by heat of the coal formation, and is produced by the destructive distillation of coal. It is found in nature in both a crystalline and amorphous or noncrystalline condition, opaque, of a metallic, steel-gray color and luster, and giving a shining, greasy streak on paper. The purest known variety of natural graphite, found at Ticonderoga, N. Y., consists of 99.9 carbon. The best Ceylon graphite contains ninety-nine per cent, and that from the famous Borrowdale mine in Cumberland, England, eighty-seven per cent of carbon. The inferior varieties of graphite frequently contain fifty to sixty per cent of foreign matter. Borrowdale graphite sometimes sold at $40 a pound, but the market price of average graphite now varies from $150 to $800 per ton.

Graphite is used for facing foundry and electrotype molds, for making stove polish, and as a lubricant. But the greatest consumption of graphite is for crucibles and pencils. When mixed with clay it forms one of the most refractory substances to heat, and from it are made the best crucibles used in chemistry and metallurgy. Only the finest graphite is used for pencils. Large, pure blocks may be sawed into sheets, which are cut into rods and put into wooden holders; but pencil leads may be made by pounding the graphite, and then pressing it into shape with more or less clay or cement, according to the hardness desired.

Graph'ophone. See PHONOGRAPH.

Grap'tolites, fossil *Hydrozoa* of the genus *Monograptus* and its allied genera; named "written stone," from the slender black tracings left by the fossils on the slates in which they occur. They first appear in early Lower Silurian rocks, and have been recognized as high up as the Hercynian rocks of Germany, which have been placed in the Lower Devonian by Keyser.


GRAPTOLITES.

Grass Cloth, popular name for fabrics made of the fiber of the ramie, made chiefly in Asia, but also to some extent in Europe. The grass cloths are durable, and often beautiful. See RAMIE.

Grasse (grās), **François Joseph Paul** (Conte de, and Marquis de Grasse-Tilly), 1723–88; French naval officer; b. Valettes, Provence; became a rear admiral, 1778; distinguished himself by his successes against the British fleet, 1780; in 1771 commanded a fleet which sailed for America; cut off Cornwallis's retreat, contributing to the reduction of Yorktown; served with distinction in the W. Indies, but was defeated by the British Admiral Rodney, and taken prisoner, 1782; held the rank of lieutenant general at the time of his death.

Grass'es, or **Gramin'eæ,** one of the largest and most important orders of flowering plants, embracing about 310 genera and 3,500 species. They are found in nearly all parts of the globe, but are especially abundant in temperate zones, where they are an important feature in the vegetation, forming the principal herbage of prairies, steppes, etc. Grasses are mostly herbaceous, but a few have woody stems, and they vary from small mosslike specimens to the giant bamboos, some of which attain a height of 100 ft. or more. The order *Gramineæ* embraces not only the plants usually termed grasses, but also the cereals, as wheat, oats, rye, barley, maize, rice, etc., plants which constitute one of the principal sources of hu-

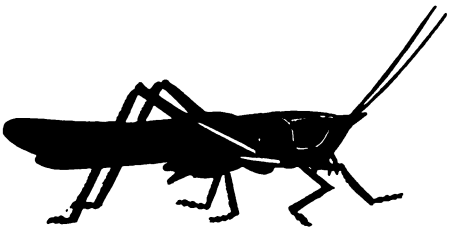
man food. Other species furnish valuable forage and fodder for animals, and the bamboos supply many of the wants of the people in some of the warmer portions of the globe.

Grasses are characterized by their chaffy flowers, free one-celled ovaries, usually plumose stigmas, versatile anthers, jointed and mostly hollow stems and two-ranked leaves. The stems, or culms, as they are often called, are generally cylindrical, differing in this respect from the sedges, which are usually triangular in section and are solid instead of hollow, as in grasses. The stems are made up of sections, called by botanists nodes and internodes. The nodes are solid, swollen portions, and the internodes are the elongated, hollow portions of the stems between each pair of nodes. From the upper part of each node a leaf is developed that sheathes the stem for some distance and then turns outward into a flattened, long blade, with veins or fibrovascular bundles running parallel from base to tip. Upon the leaf where it turns away from the stem is a small membranous outgrowth, called the ligule, the function of which is believed to be to prevent rain from running down the leaf blade and entering between the sheath and stem.

The flowers of grasses are generally believed to be simplified lilylike forms, and they consist of chaffy scales or bracts, a single pistil carrying two feathery stigmas and a single ovule, and three stamens, which number is increased to six or more in some species. The simple flowers are usually arranged on shortened axes, each flower inclosed by a bract, the whole cluster being called a spikelet. The spikelets may be arranged in many ways, either on a branched stem, as in oats, on short lateral branches constituting the heads of wheat, or they may be arranged all on one side of the axis, as in crab grass, etc. Under some conditions, instead of flowers, young rooted plantlets are developed where flowers would normally be found, and these, falling off, take root and grow. This is common with some grasses on high mountains. The roots of grasses are generally slender and fibrous, and they appear from the lower nodes, but may be produced from others if the grass is a procumbent or creeping one. Many grasses have creeping underground stems that are often considered to be roots. These aid in the rapid spread of many grasses and the quack grass (*Agropyron repens*) is a common example.

The most generally accepted classification of grasses is that of Hackel, who has arranged the genera into thirteen tribes: (1) *Maydeæ* represented by maize and teosinte; (2) *Andropogoneæ*, sugar cane, sorghum, etc.; (3) *Zoysireæ*, mostly tropical; (4) *Tristigineæ*, all tropical; (5) *Paniceæ*, with barnyard grass, foxtail, paspalum the leading sorts; (6) *Oryzeæ*, represented by cultivated rice; (7) *Phalarideæ*, canary grass, vanilla grass, etc.; (8) *Agrostideæ*, includes many important forage grasses, as redtop, timothy; (9) *Aveneæ*, oats; (10) *Festuceæ*, bluegrass, orchard grass, broom grass, etc.; (11) *Chlorideæ*, cord grass, buffalo grass; (12) *Hordeæ*, barley, rye, wheat, etc.; and (13) *Bambuseæ*, the bamboos of which there are fifty or sixty species.

Grass'hopper, term popularly and very loosely applied in the U. S. to all sorts of saltatorial *Orthoptera*. It is particularly used to designate the Rocky Mountain locust (*Caloptenus spretus*), which in certain years proves such a scourge in much of the country lying W. of the Mississippi. As it is restricted entomologically, the three principal divisions of the saltatorial *Orthoptera* are crickets, grasshoppers, and locusts. Crickets (*Achetidæ*) are distinguished from the others by invariably having the wing covers placed horizontally on the back. They have, with few exceptions, but three joints to the tarsi or feet, and as they usually live in holes away from the light, their organs of hearing and feeling, the antennæ, are very long, while those of sight are generally small. Grasshoppers (*Gryllidæ*) may be distinguished by having four joints to the feet. The wing covers are roofed, and slope downward at the sides of the body; they are long and wide, and those of the male are furnished at the base with a talclike plate, which produces the usual chirrup as the wings are rubbed sharply over one another.



COMMON MEADOW GRASSHOPPER.

Most grasshoppers are green, and their legs, though longer, are not so muscular as those of locusts. They are mostly nocturnal insects, and their antennæ are consequently long and tapering. They are also more solitary, never migrating in multitudes, like locusts. A few of the larger, tree-inhabiting species are called katydids, well-known insects peculiar to America. Locusts (*Locustidæ*) are distinguished from the above insects by having much shorter, thread-shaped antennæ, which terminate abruptly, or are sometimes even club shaped. The feet appear on the under side five jointed, but are in reality only three jointed, the basal joint being long, with two impressions underneath. They nearly all agree in having straight, narrow wing covers, lapping over and forming a ridge on the back. Their stridulation is produced by rubbing the posterior femora or thighs against the prominent nerves of the wings while resting on the fore legs. They are more robust, more muscular than grasshoppers, are essentially social and diurnal insects, and their wing covers, being so much narrower, do not impede their passage through the air in the same degree as is the case with the grasshoppers.

Grassmann's (gräss'münz) **Law**, name frequently given in treatises on comparative gram-

mar to the phonetic law, whereby in Sanskrit and in Greek an aspirate loses by dissimilation its after breath, when an aspirate stands at the beginning of the next syllable. It was discovered by Hermann Grassman, a German mathematician (1809–77); noted for his profound treatises on the theory of mathematics as well as for his philological works.

Grass Oil, volatile oil extensively distilled in the E. Indies from *Andropogon schœnanthus, A. muricatus, A. nardus, A. warancusa,* and other grasses; is used in scenting honey soap and in adulterating oils of geranium and roses; in perfumery it is called oil of citronella and lemon grass oil.

Grass Trees, or Black Boys, popular name of long-lived, treelike, liliaceous plants, somewhat resembling the yucca in habit; belonging to the genus *Xanthorrhœa.* They grow in Tasmania and Australia. Their leaves are gathered as food for cattle. The tree abounds in a balsamic gum used in medicine.

Grass Wrack, called also EEL GRASS in the U. S.; salt-water plant of the family *Naiadaceæ,* growing in coves and sea ditches, always under water, in both the Old World and the New; used to weave into the coverings of flasks, as a material for stuffing mattresses and cushions, and as packing for glass and queensware. In the U. S. it is gathered like seaweed, chiefly as a manure.

Gratian (grā'shī-ăn), or **Gratia'nus, Franciscus,** Italian canonist; founder of the science of canon law; b. Chiusi in the eleventh century; entered the convent of Classe, near Ravenna, whence he removed to that of St. Felix de Bologna. Here he wrote his "Decretum," and sent it to the pope, Alexander III, who in reward appointed him Bishop of Chiusi. The "Decretum" is a complete and systematized collection of all the canons issued by the popes and councils.

Gratian, Gratianus Augustus, 359–83; Roman emperor; son of Valentinian I; succeeded his father, 375, as Emperor of the West, his uncle Valens reigning in the East until 378; succeeded Valens in that year, but gave the dominion of the East to Theodosius I; persecuted with equal zeal pagans and heretics of the Christian confession. His wars against the barbarians were measurably successful. He was murdered by Andragathius, a follower of Maximus, who succeeded him as emperor.

Gratry (grā-trē'), **Auguste Joseph Alphonse,** 1805–72; French ecclesiastic and author; b. Lille; was one of the reorganizers of the Oratory of the Immaculate Conception and became an instructor of youth; Vicar General of the Diocese of Orleans, 1861; Prof. of Moral Theology in the Sorbonne, 1863; left the oratory, 1869; before his death accepted the definitions of the Vatican Council, which he had hitherto opposed; author of "The Knowledge of God," opposing Positivism; "Logic," "The Philosophy of the Creed," "Jesus Christ," addressed to Renan, etc.

Grat'tan, Henry, 1746–1820; Irish patriot and orator; b. Dublin; son of the recorder of the city, a Protestant, and grandson of Thomas Marlay, Chief Justice of Ireland; graduated at Trinity College, 1767; studied at the Middle Temple, London, and was admitted to the Irish bar, 1772; was a member of the Irish Parliament in 1775 from Charlton. He was, almost from the first, the leader of the opposition; brought forward, 1780, resolutions to the effect that "the king, with the consent of the Parliament of Ireland, was alone competent to enact laws to bind Ireland," and, 1782, moved a declaration of rights, asserting Ireland's right to self-government, which secured the unanimous passage of resolutions pledging the British Parliament to a redress of grievances. For his services he was given a valuable estate by the Irish Parliament. He was returned, 1790, from Dublin; opposed the United Irishmen and the union with Great Britain; entered the imperial Parliament, 1805; advocated Catholic emancipation.

Gratz, city of Austria; capital of Styria; on the Mur at an elevation of 1,047 ft. above the level of the sea, and forming the principal station on the route from Vienna to Trieste; is an old town, with narrow and crooked streets, but its surroundings are very picturesque, and it contains many interesting buildings. The old ducal palace is a structure of great interest. Gratz has a university and many other good educational institutions. Its manufactures of steel and iron wares and saltpeter are large, and its trade very extensive. Pop. (1900) 138,080.

Gravat'na. See BLOWPIPE AND ARROW.

Gravelines (grăv-lēn'), fortified town of France; department of Nord, on the Aa, where it falls into the English Channel; famous from the battle, 1558, in which the Spanish under Count Egmont defeated the French under Marshal de Thermes. Pop. abt. 2,000.

Gravelotte (grăv-lōt'), **Bat'tle of,** also called BATTLE OF REZONVILLE, or, by the French, BATTLE OF ST. PRIVAT, greatest and bloodiest battle of the Franco-German War of 1870–71. By the battle of Vionville, August 16th, the French army was prevented from marching to Verdun, and Bazaine concentrated his forces nearer Metz, and occupied, with his front facing W., a favorable defensive position, marked by the points of St. Privat, Amanvillers, Verneville, and Rozerieulles. On August 18th the German army under King William made an attack, beginning at the French center, the Ninth Corps planting its batteries at noon on the hill of Verneville, and opening a violent fire on the French batteries at Ste. Marie, St. Privat, and Amanvillers. It was seven o'clock P.M. when St. Privat was taken, and it was completely dark when the battle was finally decided by the failure of the attempt at breaking through the German lines at Gravelotte; the French army was now shut up in Metz, and could not escape. The Germans, numbering 211,000, lost 904 officers and 19,658 men; the French, numbering 140,000, lost 609 officers and 11,605 men.

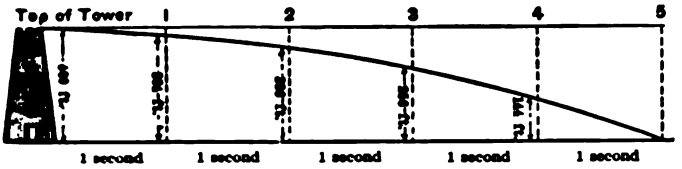
Grave of France, term applied to the battle field of Waterloo.

Graves's Disease'. See BASEDOW'S DISEASE.

Gravim'eter. See HYDROMETER.

Grav'ing Docks. See DOCKS and DOCKYARDS.

Grav'ity, or Gravita'tion, in its widest sense the tendency of all bodies to approach each other with a force directly as their masses, and inversely proportional to the square of the distance between them. There are two ways in which the action of terrestrial gravity at any station can be measured: *viz.*, by the weight which it gives to bodies (statical action), and by its effect on falling bodies (dynamical action). For many reasons the latter is the more convenient method of measuring it. Atwood's machine can be employed to obtain a fair approximation to the velocity acquired by falling bodies in a given time; but for all delicate researches the pendulum is employed. Gravity varies on the earth's surface owing to two principal causes, *viz.*: 1, the centrifugal force, which increases from the poles to the equator, and alone would decrease the weight of a body at the equator by $\frac{1}{289}$ part; and 2, the oblate spheroidal shape of the earth, which brings bodies on its surface at the poles nearer the center of gravity. A complete mathematical comparison of the attractions under the two conditions shows that gravity at the equator from the second cause is less than gravity at the poles by about $\frac{1}{194}$. Combining the two effects, we obtain for the total decrease of gravity at the equator: $\frac{1}{289} + \frac{1}{194} = \frac{1}{195}$, or the ratio of gravity at the equator to that at the poles is 194: 195.



FORCE OF GRAVITY. PATH OF CANNON BALL.

Newton showed that the same force which causes a stone to fall extends to the moon and holds her in her orbit, and is only a special case of a force which extends through the entire solar system. He showed that the planets tend to fall toward the sun, the satellites toward the planets, and the moon toward the earth, according to the same law by which an apple falls to the ground. To compute the effect of these attractions is a problem which has occupied the attention of most of the great mathematicians since Newton, and the result has been that the most complicated motions of the heavenly bodies can be predicted years in advance with a degree of accuracy limited only by the mathematician's power of calculating and the practical astronomer's power of observing.

The demonstration of gravitation has not been limited to the sun, moon, and planets. In 1772 Maskelyne determined the attraction of a mountain, and this attraction is now shown whenever accurate observations for latitude and longitude are made in the neighborhood of great mountain chains. Not only so, but Cavendish and Bailly succeeded in measuring the attraction of balls of lead on very delicately balanced weights, and thus found the mean density of the earth to be about six times that of water. See ATTRACTION; CENTER OF GRAVITY.

Gravity, Specif'ic, ratio of the weight of one body to that of an equal volume of another, adopted as a standard of reference. For solids and liquids the standard is pure water, at a temperature of 60° F., the barometer being at 30 in. Different methods may be employed to ascertain the specific gravity of solids. That by measuring the bulk and weighing is rarely practicable, nor is it desirable. As a body immersed in water must displace its own bulk of the fluid, the specific gravity may be ascertained by introducing a body, after weighing it, into a vessel exactly filled with water, and then weighing the fluid which is expelled. The proportional weight is thus at once obtained. Wax will cause its own weight of water to overflow; its specific gravity is then 1. Platinum, according to the condition it is in,, will cause only from $\frac{1}{21}$ to $\frac{1}{21.5}$ of its weight of water to escape, showing its specific gravity to be from 21 to 21.5. A more exact method than this, however, is commonly employed. The difference of weight of the same substance, weighed in air and when immersed in water, is exactly that of the water it displaces, and may consequently be taken as the weight of its own bulk of water. A common method for finding the specific gravity of fluids is by the hydrometer. The specific gravity of a gas may be obtained by weighing in an air-tight vessel equal quantities of atmospheric air and of the gas; or it may be calculated from its atomic weight.

Gray, Asa, 1810–88; American botanist; b. Paris, N. Y.; was Fisher Prof. of Natural History in Harvard Univ., 1842–73; chosen, 1874, a regent of the Smithsonian Institution; elected a member of the Institute of France, 1878; wrote many works, including "Elements of Botany," 1836; "Manual of Botany"; "Flora of North America," with Dr. Torrey; "Botany of the United States Pacific Exploring Expedition"; "How Plants Grow"; "Structural and Systematic Botany"; "Darwiniana." He was president of the American Academy of Arts and Sciences for ten years.

Gray, Elisha, 1835–1901; American inventor; b. Barnesville, Ohio; after engaging in the manufacture of electrical apparatus in Cleveland, organized the Western Electric Co., 1872, from which he retired, 1874, though for many years he remained its electrician; invented telegraphic relays, switches, and repeaters, an enunciator system for hotels, a type-printing telegraph, a multiplex system of telegraphy, and a telautograph for transmitting writing and sketches; he early experimented with the

telephone, and the priority of the first patents was long a legal dispute between him and Prof. A. Graham Bell.

Gray, Henry Peters, 1819–77; American genre and portrait painter; b. New York; president National Academy, 1869–71. His "Wages of War" is in the Metropolitan Museum, New York; "Cupid Begging his Arrow" in the Pennsylvania Academy, Philadelphia; "Judgment of Paris" in the Corcoran Gallery, Washington.

Gray, Thomas, 1716–71; English poet; b. Cornhill, London; traveled in Italy and France (1739–41) with Horace Walpole; lived at Cambridge Univ., in which he was appointed Prof. of Modern History, 1768, but never actively engaged in the duties of that position. Gray's fame rests almost entirely on his "Elegy Written in a Country Churchyard," 1749, which has given him a high position in English literature.

Gray Fri'ars. See FRANCISCANS.

Gray'ling, popular name of a genus of fishes, resembling the trout in habits and character; is one of the best of the game fishes. The

MICHIGAN GRAYLING.

common grayling of Europe is in great request for the table. A species is found in some streams of Michigan and in the headwaters of the Yellowstone.

Gray's Peak, eminence in the Rocky Mountains, in Summit and Clear Creek Cos., Col.; 12 m. W. of Georgetown; is 14,341 ft. in height; named in honor of Dr. Asa Gray.

Grazzini (grät-sē'nē), **Antonio Francesco,** 1503–83; Italian author; b. Florence. Very little is known of his personal life, but in the history of Italian literature he acquired a famous name, partly as founder of the Accademia della Crusca, partly by his poetical works ("Le Cene," a collection of stories in the manner of Boccaccio) and a number of comedies ("La Gelosia," "La Spiritata," etc.). He was generally called Il Lasca or Leuciscus by his literary friends.

Great Ba'sin, or Fre'mont's Basin, remarkable region lying between the Wahsatch Mountains on the E. and the Sierra Nevada on the W., embracing Nevada, the W. portion of Utah, and the SE. part of California. Its waters have no outlet to the ocean. It is traversed by parallel mountain ridges having a N. and S. direction. Its elevation varies from 4,000 to 8,000 ft. above the sea. The principal body of water is Great Salt Lake, in the NE. part, which receives the Bear and Jordan rivers. Among the other rivers are the Humboldt, Sevier, and Carson. It is mostly an arid waste, covered with alkaline deposits, and producing only sage brush. The climate is dry, rain rarely falling from April to October. The basin is rich in the precious metals, particularly silver.

Great Bear. See URSA MAJOR.

Great Bear Lake, large body of water in Canada, under the Arctic circle, between longitude 117° and 123° W.; has an irregular outline, is very deep and clear, abounds in fish, and is frozen over for half the year; its outlet, Bear River, empties into the Mackenzie River; area, 11,281 sq. m.

Great Brit'ain and Ire'land, Unit'ed King'dom of, kingdom of W. Europe, comprising Great Britain and Ireland, the Shetland, Hebrides, Orkney, Scilly, and other groups of islands. The Isle of Man, and the Channel Islands near the coast of France, are not represented in Parliament, and, having their own ancient institutions, are in reality mere British dependencies. England is divided into fifty administrative counties and Wales into twelve; Scotland into thirty-three civil counties, grouped under eight geographical divisions; Ireland into four provinces and thirty-two counties, besides the cities of Dublin and Belfast. Great Britain, the largest island in Europe, is separated from the Continent of Europe by the British Channel, the narrowest portion of which is called the Strait of Dover, and by the German Ocean, or North Sea. Ireland is separated from Great Britain by the Irish Channel, or Sea, which communicates with the open Atlantic through the North Channel and St. George's Channel; greatest length of Great Britain, from N. to S., 608 m.; greatest breadth, between Land's End and the North Foreland in Kent, 325 m.; breadth between the Firths of the Forth and Clyde, about 30 m.; area of Britain, Ireland, and the Isle of Man, 121,316; pop. (1907), 44,412,000. For details as to the physical geography of the component parts, see ENGLAND, IRELAND, SCOTLAND, WALES, and the articles on the various islands. Of the total area of the United Kingdom, 3,070,000 acres are under woods and plantations; 12,789,000 acres consist of mountain and heath grazing land. The principal crops are wheat, barley and bear, oats, beans, peas, potatoes, turnips, and swedes. Great Britain produces more per acre of every staple food suited to her soil and climate than any other country in the world, but has a larger population in proportion to the cultivable area than any other country in Europe, and it is impossible, therefore, to provide the food required without very large importations. The land is high-priced, and ocean transportation has become so cheap that the farmers of Great Britain find it almost impossible to compete with wheat from India and the U. S., cattle from the plains of Colorado and Texas, mutton from New Zealand, and fruit from various foreign sources of supply. Rents of farm lands in some English counties have fallen to nominal figures, in many cases to less than fifty per cent of their former values, and a considerable extent of land has passed out of

MAP OF THE
BRITISH ISLES
SCALE OF MILES
SHETLAND
ISLANDS
Lerwick
ORKNEY
ISLANDS
Cape Wrath
Wick
Buchan Ness
Aberdeen
Edinburgh
Newcastle
Sunderland
Hull
Dublin
Liverpool
Manchester
Sheffield
Birmingham
London
Guildford
Plymouth
Lizard Head
Lands End
Portland Bill
Beachy Head
Dover
Dieppe
Havre
CHANNEL ISLANDS
NORTH SEA
IRISH SEA
BRISTOL CHANNEL
ENGLISH CHANNEL
NORTH CHANNEL
ST. GEORGE'S CHANNEL
ATLANTIC OCEAN
Longitude West from Greenwich

cultivation owing to the inability of the farmer to complete with the cheap prices at which food products are imported from abroad.

The number of men employed in the British fisheries (1907) 107,076; the registered boats, 26,125. Salmon are caught almost exclusively in the rivers of Scotland and Ireland; the herring fisheries are carried on principally from the Scotch ports; the pilchard is caught on the coasts of Cornwall and Devon, and England (Essex and Kent) has the best oysters.

The mining industry employs some 972,220 men. The largest production of coal is in the counties of Durham, York, Lancaster, Derby, and Stafford, England; Glamorgan, Wales; and in Lanark, Scotland. The total production, 1907, was 267,830,962 tons. The iron industry is the most important next to that of coal. It has assumed gigantic proportions since 1740, when coal was first used for smelting the ore. The tons raised in 1907 amounted to 15,731,604, having a value of $35,312,810. The iron ores of Great Britain are generally associated with the coal beds, which enhances their value. Copper is mined principally in Cornwall and Devon, as well as in Scotland and Ireland. Lead has been worked in Derby from the time of the Romans, but has since been discovered in other parts of the island, including Cornwall and Devon, the only counties furnishing tin, and celebrated on that account among the Phœnicians. The ores of zinc, arsenic, manganese, antimony, nickel, silver, gold, etc., are of subordinate importance.

The textile factories of the United Kingdom employ over 1,029,000 persons, cotton spinning alone employing more than 600,000.

The cotton exports from Great Britain have for years been slowly decreasing, though Great Britain is still far ahead of all other countries in this branch of her export trade. A number of the industries of the W. of England have almost ceased to exist. The manufacture of lace is no longer prosperous, as the introduction of machinery has caused it to suffer more and more. The exports of woolen manufactures have not fallen off to any important extent, and in some lines have increased. Great Britain consumes about six elevenths of her woolen manufactures. Some grades of carpets once famous have ceased to be manufactured. The linen industry, carried on chiefly in Scotland and Ireland, has declined. The silk industry has grown considerably, but the product falls far short of meeting the home demand. Silk is the only textile industry for which England is dependent, in part, upon other countries.

Next to the textile industries the most important are the metal manufactures, ranging from the production of rails to that of steam engines, iron ships, and of the finest cutlery and silversmith's work, but these have suffered severely from American and German competition, and England has been surpassed by the U. S. in the cheapness and quantity of iron and steel produced. In the British iron and steel trades the opening of new markets, the cost of labor, and the success of foreign competition are important questions, but a still more pressing matter is the problem how and whence the British blast furnaces are to secure adequate supplies of ore at a reasonable cost, for the supplies of home ores have been falling off from year to year. Shipbuilding is an important industry, having as its chief centers the NE. coast and the Clyde district.

The shipping holds the first rank among the commercial marines of the world. In the foreign as well as home trade the British flag by far exceeds the flags of all other nations combined, and this result is achieved without differential duties, for even the coasting trade is open to foreigners on equal terms with the natives. The shipping engaged in the home and foreign trade, 1907, comprised 5,741 sailing and 9,005 steam vessels, with total tonnage of 11,288,759. There are neither export nor protective duties, for the customs duties levied on articles which are likewise manufactured in the United Kingdom are balanced by corresponding excise or stamp duties. Probably no tariff is so simple as that of the United Kingdom. It includes cocoa, coffee, chicory, tea, tobacco, wine, dried fruit, beer and ale, malt, vinegar, spirits, plate, and playing cards. Commercial activity has assumed most gigantic proportions, for Great Britain not only exchanges her own products for those of foreign countries, but likewise acts as the agent for continental and other foreign markets.

Total value of imports of merchandise of the United Kingdom (1906), $3,229,520,880; of exports of British produce, $2,131,022,980; imports from the U. S. (1906), $650,579,000; exports to the U. S., $151,230,000. Imports are mainly from the U. S., France, India, Holland, Germany, Russia, Australia, Belgium, Argentine Republic, and Canada; exports mainly to India, Germany, the U. S., E. and S. Africa, and Australia. For details as to religion and education, see ENGLAND, IRELAND, SCOTLAND, WALES.

The government is a constitutional monarchy. The sovereign represents the executive, while legislation is the work of the Imperial Parliament. The "Act of Settlement" settles the succession on the descendants of Sophia of Hanover, and no change in the act can be made except by consent of Parliament. The heir apparent since Edward III assumes the title of Prince of Wales. The civil list granted to the king amounts to £470,000 a year, in addition to which he receives the revenues of the Duchy of Lancaster (£63,000 net). The members of the royal family receive annuities amounting to £100,000, and the Prince of Wales, in addition, receives the revenues of the Duchy of Cornwall (£80,000). The royal palaces are Buckingham, St. James's, and Kensington Palace, in London; Windsor Castle, Balmoral (Scotland); and Osborne House (Isle of Wight).

Parliament consists of the sovereign, the House of Lords, and the House of Commons, and no act obtains the force of law until it has been passed by all three. The House of Lords consists of peers who hold their seats: (1) by hereditary right; (2) by creation of the sovereign; (3) by virtue of office—English bishops; (4) by election for life—Irish peers; (5) by election for duration of Parliament—

Scottish peers. The number of names on the "roll" in 1907 was 616. There are, besides, 11 peeresses of the United Kingdom in their own right, and 3 Scottish peeresses, and 20 Scottish and 67 Irish peers who are not peers of Parliament. The Lord High Chancellor presides over the sessions of the House of Lords. The House of Commons consists of 670 members (495 for England and Wales, 72 for Scotland, and 103 for Ireland). Of these, 284 are the representatives of boroughs, 377 represent rural constituencies, and 9 the universities. In 1885 the right of voting was extended to all householders and to lodgers paying an annual rent of £10. All elections are by secret vote and ballot, and the regulations against bribery and undue influence are stringent. Members are not paid for their services, nor are they able to compensate themselves by an exercise of patronage, as all government appointments are made for life. The total number of registered electors, 1907, was 7,514,481.

The sovereign appoints the members of the privy council, the lord mayor of London being the only *ex-officio* member, but public business is in reality conducted by a cabinet council, whose members are likewise appointed by the sovereign, but are responsible to Parliament. Their appointment is consequently virtually made by the party. The members of the cabinet are the first Lord of the Treasury (generally Prime Minister), the Lord High Chancellor (the highest legal official and president of the House of Lords), the Chancellor of the Exchequer, Secretaries of State for the Home Department, Foreign Affairs, the Colonies, War, and India, the first Lord of the Admiralty, the President of the Board of Trade, the President of the Local Government Board, the Postmaster-General, the first Commissioner of Works, the Vice President of the Council on Education, the Chief Secretary of the Lord Lieutenant of Ireland, the Secretary for Scotland, and the Chancellor of the Duchy of Lancaster. The legal advisers of the crown are an attorney-general and a solicitor general, who both go out with the cabinet. In Ireland the crown is represented by a lord lieutenant.

The revenue (actual receipts) in 1906–7 amounted to $724,775,990, derived chiefly from customs, taxes on property and income, and excise. Customs duties are charged on spirits, beer, wine, tobacco, tea, coffee, cocoa, and a few other articles. Excise duties (countervailing the import duties) are levied on distillers and brewers, on passenger fares (where the fare exceeds 1*d.* a mile), and on licensed victualers. Death duties constitute the principal item under "stamps." There is an insignificant land tax and a duty on houses valued at £20 a year or more. A property and income tax (6*d.* in the pound) is levied on the annual value of property and of profits, but incomes of less than £150 are exempt, while an abatement of £120 is allowed on all incomes not exceeding £400 per annum.

The expenditure (actual payments), 1906–7, chiefly for the debt and consolidated fund, army, navy, and civil services, was $697,076,255; revenue, $724,070,365. The funded debt (1906–7) was $3,170,237,145. The total gross liabilities, $3,870,823,520. The strength of the regular army at home (1909) was: Regular troops in the British islands (combatants), 118,734; army service, medical, and other noncombatant corps, 11,414; total, 130,148. Abroad: Troops, including noncombatant corps, in India, 76,155; same in the Colonies; S. Africa, 16,213; Egypt, 5,719; Mediterranean, 12,390; China and Hongkong, 3,101; W. Indies, 1,721; other colonies, 3,226; particular service, etc., 52; total, 117,218. The navy (1909) comprised 126,272 men of all ranks, of whom 121,866 were in sea service. There were also 46,471 in the naval reserve. The navy (1908) consisted of 459 vessels. The great dock yards at Portsmouth, Chatham (or Sheerness), Devonport, and Pembroke employ over 20,000 workmen.

The union between England and Scotland was established May 1, 1707. For years after, intrigues for the restoration of the Pretender (representative of the exiled Stuarts) were carried on. Queen Anne, 1702–14, was succeeded by the Elector of Hanover, who took the title of George I. A commercial crisis, 1720, brought on the South Sea Bubble, which wrought ruin in thousands of households. Under George II, 1727–60, Great Britain was involved in a war with Spain and in the War of the Austrian Succession. A second attempt of Prince Charles Edward Stuart to regain the throne was crushed at Culloden, 1746. During the Seven Years' War, Clive drove the French from India, and Wolfe conquered Canada. During the reign of George III, 1760–1820, a war with France and Spain increased the colonial territory, but the N. American colonies were driven into rebellion and the U. S. came into existence. In this period fell the war with France, declared 1793, and really terminated with the battle of Waterloo, 1815; also the war with the U. S., 1812–14. Under George IV, 1820–30, commercial reforms were introduced, and an act emancipating Roman Catholics was passed, 1829. After the accession of William IV, 1830, a Whig ministry came into office after an exclusion of fifty years, the first parliamentary reform bill was passed, 1832; slavery in the colonies was abolished, 1834, and the poor law and the municipal corporations were reformed.

Under Victoria, 1837–1901, the advocates of free trade succeeded in abolishing the corn laws, 1846, and in removing restrictions on trade and commerce; the political institutions of the country became largely democratized through parliamentary and municipal reforms; the Protestant Episcopal Church in Ireland was disestablished, 1869; the Home Rule agitation in Ireland was prosecuted; the Crimean War, 1854–56, was undertaken with France; a mutiny in India, 1857, was quelled; Afghanistan was the scene of military operations, 1841–42, 1878–79; China was compelled to enter into commercial treaties, 1840–42, 1858; a rebellion in Egypt, headed by Arabi, was suppressed, 1882, and that country practically became a dependency; the Sudan was given up after the fruitless defense of Khartum by Gen. Gordon, 1885, but reconquered,

1898; British troops were engaged in Abyssinia, 1861; Ashanti, 1873–74; Zululand, 1879; and S. Africa (Boer War), 1880–81. Gladstone's government failed to secure home rule for Ireland; the British N. American Act, 1867, and the Commonwealth of Australia Act, 1900, indicated a tendency to imperial federation. After the accession of Edward VII, 1901, the chief events were the movement (1903) under Joseph Chamberlain favoring the adoption of a policy of preferential tariffs; an agreement with France, 1904, recognizing the latter's right to preserve order in Morocco and promising assistance in carrying out certain reforms in exchange for commercial concessions; a treaty with Japan, 1905, for the purpose of maintaining their respective territorial rights in E. Asia and India; a treaty with France and Spain, 1907, in which the three powers guaranteed the integrity of their respective coasts and their insular and territorial possessions in the E. Atlantic and Mediterranean. See BRITISH EMPIRE.

Great Cataw'ba. See CATAWBA.

Great-cir'cle Sail'ing, a method of navigating a ship so that her course will be along an arc of a great circle which joins any two points on the earth's surface; that is, along a circle the plane of which extended through the globe passes through its center and divides it into two hemispheres. That this is the shortest possible distance between any two points might be demonstrated on mathematical principles. It may be made apparent, however, by measurement on an artificial globe; for anyone may satisfy himself of its truth by stretching a thread between two places in nearly the same latitude and considerably distant in longitude. Theoretically, then, this is the true line of sailing for ships. The foundation of their course must be the track which the spherical nature of the globe points out as the shortest distance between two given harbors. But a mere inspection of the globe shows at once that this rule, based on its spherical form, is modified by geographical considerations, by the natural projections of the continents, and by islands and rocks which lie across or near the great-circle arcs.

The experience of the navigator has further taught him the prevalence, in different quarters of the world, of constant and powerful winds and currents, by making use of which on one course, or avoiding them on another, he gains more than by following rigorously the great-circle arc. The navigator's rule, therefore, must be that he sail his vessel on a great circle wherever the land, rocks, or shoals do not intervene, or where the prevalence of powerful currents or adverse winds will not lessen his speed more than the difference between the distance on a great circle and that of another route more favored in these respects. When compelled to deviate from a rigorous following of this shortest line, he may gain time by resorting to composite sailing; that is to say, to sailing on successive arcs of great circles between intermediate points selected to suit the winds, currents, and projections of land. His inquiry will be which course will be the shortest, taking into view all the impediments in his way.

Great East'ern, vessel which, until the building of the Celtic in 1901, was the largest in the history of shipbuilding. She was a paddle and screw iron steamer, designed by I. K. Brunel and Scott Russell, and was built at London, 1854–57. She was designed to make the voyage from England to India via the Cape without having to stop at coaling stations, as she could carry 15,000 tons of coal with 5,000 tons of freight, and at least 1,000 passengers. She was 679 ft. 6 in. long and 82 ft. 8 in. broad; tonnage, 18,915. She was at various times known as the *Leviathan*, the *Great Eastern*, or the *Great Ship*. As a passenger ship she was commercially a failure, but, when remodeled to lay transoceanic cables, she did good service. In 1884 she became a coal hulk at Gibraltar, and in 1887 was sold for $82,500 and broken up.

Great Falls, capital of Cascade Co., Mont.; at the junction of the Sun and Missouri rivers, near the Falls of Missouri; near by are rich mines of gold, copper, silver, lead, iron, and coal, and quarries of sandstone. An immense dam at Black Eagle Falls gives abundant power for manufacturing. For smelting silver and copper there are plants that cost $5,000,000. Great quantities of wool are shipped hence. Pop. (1906) 21,500.

Great Fish Riv'er, large stream in Canada, flowing some 500 m. in a NE. course to Cockburn Bay, an arm of the Arctic Ocean. It is not navigable. Another river of the same name in the Cape Colony, Africa, rises in the Snowy Mountains and enters the Indian Ocean after a course of 230 m.

Great Kanawha (kä-nä'wä) **Riv'er.** See KANAWHA RIVER.

Great Moth'er, phrase applied to the earth by Junius Brutus. It is related that he and the sons of Tarquin consulted the oracle of Delphi in order to learn who should succeed Superbus on the throne of Rome. They received as answer: "He who shall first kiss his mother." The Tarquins hastened home to fulfill the apparent meaning, but Brutus fell to the ground, exclaiming, "Thus I kiss thee, O earth, the great mother of us all!"

Great Pedee (pē-dē') **Riv'er.** See PEDEE RIVER.

Great Salt Lake, largest lake in the Great Basin (*q.v.*) in NW. Utah, between the Rocky Mountain system and the Sierra Nevada. It is about 80 m. long and 30 to 50 wide; is a very shallow sheet of water, not over 50 ft. at deepest, lying with flat shores on a desert plateau, 4,250 ft. above the sea. Its tributaries are the Bear River from the NE., Weber from the E., and Jordan from the S. The lake waters are densely salt, their specific gravity being 1.1 +. No fish live in the lake, its fauna being limited to a small brine shrimp (*Artemia gracilis*) and the larva of a fly (*Ephydra gracilis*). Black Rock, an extensive bathing establishment, is visited by many

persons for the novelty of a bath in the dense lake, in which the body easily floats, head and shoulders above water.

Great Slave Lake, body of water in Canada, between 60° 40′ and 63° N. lat., and 109° 30′ and 117° 30′ W. long; greatest length, 300 m.; breadth, 50 m.; abounds in islands; is frozen over for half the year, and has in part high wooded and rugged shores. The rivers Hay, Peace, Athabasca, English, Slave, Linah, and other large streams swell its waters, which are discharged into the Mackenzie River. Area, 10,719 sq. m.

Great Slave Riv'er, river of British N. America; flows 300 m. from Lake Athabasca to Great Slave Lake. Its upper course is broken by rapids.

Great Wall of Chi'na. See CHINA, GREAT WALL OF.

Great White Fa'ther, term applied by the American Indians to the President of the U. S.

Grebe, or **Dip'per,** name applied to various aquatic birds of the genus *Podiceps*. The U. S. have nine species, frequenting lakes, rivers, and sea coasts. The crested or satin grebe of both continents is much hunted for its coat of silvery feathers, which is used in trimming

GREBE.

ladies' dresses and in making muffs. It is rare and costly. The horned or Slavonian grebe is common to both continents. The smaller species are called dabchicks. They are awkward on land, but are expert divers, having the power of remaining long under water and thrusting up the bill for a supply of air. It is asserted that the little grebe builds a floating nest, which she removes at the approach of danger, paddling it with one foot.

Gre'cian Ar'chitecture, the system of building developed in ancient Greece and her colonies, specially characterized by extreme simplicity of arrangement and construction, combined with extraordinary delicacy and refinement of proportion and detail. The oldest remains of historic Greek architecture are the ruins of the temple at Corinth, erected abt. 650 B.C., and those of a temple at Selinous, Sicily, of not much later date. These, like all the known Greek temples and civic buildings previous to the Persian wars, are in what is called the Doric style or order, which is characterized by sturdy shallow fluted columns without bases, and having simple capitals, consisting of a spreading circular cushion or *echinus* and a plain square cap or abacus. It employs a plain architrave or lintel, a frieze divided into square panels or metopes by vertical grooved or channeled blocks called triglyphs, and a cornice with a plain shelflike corona, decorated on the under side with slightly projecting panels or *mutules*. These are ornamented with rows of peglike projections or *guttæ*. Above the corona are two or three small moldings, and (except along the sides of the temple) a *cymatium*, or gutter molding. The moldings were decorated with patterns painted in brilliant colors; the metopes, or their backgrounds when they were filled with color, were painted a dark red, and the triglyphs blue, and color was liberally used on all parts of the architecture.

After the Persian wars the ascendency of Athens and the prosperity of the Ionian cities of Greece and Asia Minor led to the Ionic style, characterized by its capitals with voluted or spiral scroll-like ornament, slender columns deeply fluted, and rich bases; by the substitution of carved for painted ornament on the moldings; by the use of dentils in the cornice; by the absence of triglyphs; and by a general richness and elegance. It seems to have originated in Asia Minor, and to have been strongly affected by Persian and Lycian influence.

About the time of Alexander, 333 B.C., a modification of the Ionic, called the *Corinthian*, came into use, its chief innovation being in the capital, which was composed of two rows of richly carved acanthus leaves, and sixteen scrolls meeting in pairs under the four corners and four middle points of the abacus, the whole disposed around a tall bell-shaped core. This order it was reserved for the Romans to adopt and perfect, enriching it greatly. Only two distinctively Corinthian monuments are recognized in Greece—the Choragic monument of Lysicrates and the Temple of the Olympian Zeus, both at Athens. The Parthenon, also at Athens, is of the Doric order; the Erechtheum, in the same city, is Ionic. See ARCHITECTURE.

Greece (Gr. name of country, HELLAS; of people, HELLENES), kingdom of SE. Europe, under the protection, by treaty, of Great Britain, France, and Russia; comprising the S. extremity of the Balkan Peninsula and numerous outlying islands; bounded by Turkey and the Ægean, Ionian, and Mediterranean seas; area, 25,014 sq. m.; pop. (1907), 2,632,000; capital, Athens; principal cities, with population, 1906: Athens, 170,000; Piræus, 70,000; other cities (1896), Patras, 37,958; Trikkala, 21,149; Corfu, 17,918; Hermoupolis, 17,894; Volo, 16,232; Larisa, 15,373; and Zante, 14,650. For many years the country, for administrative purposes, was divided into four sections—N. Greece, the Peloponnesus, the Islands, and Thessaly—and these into sixteen nomarchies, or provinces; but under a law of 1899 there was a new division into twenty-six

nomarchies, and these into sixty-nine districts and 450 communes. Greece is very irregular in shape, a sort of rude triangle. It is almost surrounded by water, terminating on the S. in Cape Matapan (Tænarum Promontory), the most S. point in Europe. It is divided near the middle by the Corinthian and Saronic gulfs, separated by the Isthmus of Corinth, 4 to 8 m. wide, which was pierced by a canal 4 m. long, 1882–93. The three natural divisions of ancient Greece were N. Greece, which extended from the Cambunian Mountains to the Ambracian and Malian gulfs; central Greece, or the territory between these gulfs and the Isthmus of Corinth; and the Peloponnesus, now called the Morea, which lies S. of the isthmus.

The continuous mountain range forming the N. boundary of ancient Greece is crossed at its center by the chain of Pindus, which, running nearly N. and S., forms a natural boundary between Epirus and Thessaly. Near its S. end it divides into two branches, one stretching SE. and terminating at the extremity of Attica, the other extending SW. and terminating near the W. end of the Corinthian gulf. The mountains of the Peloponnesus are clustered in knots and groups around a lofty central mass. The principal peaks are as follows: in N. Greece, Mts. Olympus (9,754 ft.), Ossa (6,407), and Pelion (5,000); in central Greece, Mts. Parnassus (highest summit, 8,068), Œta (7,071), Helicon (about 5,000), Cithæron (4,620), and Parnes (4,193); in the Peloponnesus, Cyllene (7,788), Erymanthus (7,297), Taygetus (highest peak, 7,904), Artemisius (5,814), and Lycæus (4,659). The rivers are generally unimportant, save on account of their historic associations. In N. and central Greece are the Achelous, Peneus, Cephissus, and Asopus; in the Peloponnesus, the Alpheus and the Eurotas. The principal lakes are Nessonis, Bœbeis, Trichonis, Copais, and Stymphalus. The climate, which is generally temperate and pleasant, appears to have been more generally healthful in ancient times than of recent years.

Greece is a constitutional monarchy, with entire legislative authority vested in a single chamber, called the Bulé, consisting of 235 representatives elected for the term of four years, and sitting annually for three to six months. The majority of the inhabitants are adherents of the Greek Orthodox Church, which is the religion of the state, but all other sects have complete liberty of worship. The state church has 21 archbishops and 29 bishops. There are 171 monasteries and 9 nunneries, with over 2,200 monks and about 200 nuns. Education is compulsory between the ages of five and twelve. The cost of primary instruction is borne by the communes, with an appropriation by the state. The educational system embraces primary schools, "Greek schools," normal schools, agricultural schools, government trade schools at Athens and Patras, Rizari Ecclesiastical Seminary, Univ. of Athens, Polytechnicum Mezzovion, providing instruction in painting, sculpture, and mechanics. Prominent among many private institutions is the American School for Classical Study at Athens. Under a new law military service for twelve years is required of all adult males, and the regulations provide for an army of from 120,000 to 130,000 men on a war footing. The navy comprises three small battle ships, a few gunboats, and some torpedo craft. The revenue, 1906, was $19,743,277; expenditure, $19,540,468; imports (1907) $27,915,000; exports, $23,841,000; debt (1906) $145,183,500 gold and $31,222,675 paper; length of railroad lines about 845 m.; of telegraph, 4,883 m.; of telephone, 436 m.

Ancient Greece.—The history of ancient Greece is divided into three periods: its rise, its power, and its fall. The first extends from the origin of the people, abt. 1800 years B.C., to Lycurgus, 875 years B.C..; the second extends from that time to the conquest of Greece by the Romans, 146 B.C.; the third shows the Greeks as a conquered people, constantly on the decline, until at length, abt. 300 A.D., the old Grecian states were swallowed up in the Byzantine Empire. According to tradition, the Pelasgi, under Inachus, were the first people who wandered into Greece. They dwelt in caves in the earth, supporting themselves on wild fruits, and eating the flesh of their conquered enemies, until Phoroneus, who is called King of Argos, began to introduce civilization among them. Pelasgus in Arcadia, and Ægialeus in Achaia, endeavored at the same time to civilize their savage subjects. Small kingdoms arose; *e.g.*, Sparta and Athens. Deucalion's flood, 1514 B.C., and the emigration of a new people from Asia, the Hellenes, produced great changes. The Hellenes spread themselves over Greece, and drove out the Pelasgi, or mingled with them. Their name became the general name of the Greeks. Greece now raised itself from its savage state, and improved still more rapidly after the arrival of some Phœnician and Egyptian colonies. About sixty years after the flood of Deucalion, Cadmus, the Phœnician, settled in Thebes, and introduced a knowledge of the alphabet. Ceres, from Sicily, and Triptolemus, from Eleusis, taught the nation agriculture, and Bacchus planted the vine. The Egyptian fugitive Danaus came to Argos, and Cecrops to Attica.

Now began the heroic age, to which Hercules, Jason, Pirithous, and Theseus belong, and that of the old bards and sages. A warlike spirit filled the whole nation, so that every quarrel called all the heroes of Greece to arms, as, for instance, the war against Thebes, and the Trojan War, 1200 B.C. This war deprived many kingdoms of their princes, and produced a general confusion, of which the Heraclidæ took advantage, eighty years after the destruction of Troy, to possess themselves of the Peloponnesus. They drove out the Ionians and Achæans, who took refuge in Attica; but, not finding here sufficient room, Neleus (1044) led an Ionian colony to Asia Minor, where a colony of Æolians, from the Peloponnesus, had already settled, and was followed, eighty years after, by a colony of Dorians. In other states republics were founded, *viz.*, in Phocis, in Thebes, and in the Asiatic colonies, and at length also in Athens and many other places; so that, for the next four hundred years, all the

S. part of Greece was for the most part occupied by republics.

Their prosperity and the fineness of the climate, in the meantime, made the Asiatic colonies the mothers of the arts and of learning. They gave birth to the songs of Homer and Hesiod. Their commerce, navigation, and law flourished. Greece, however, still retained its ancient simplicity of manners. If the population of any state became too numerous, colonies were sent out; for example, in the seventh and eighth centuries, the powerful colonies of Rhegium, Syracuse, Sybaris, Crotona, Tarentum, Gela, Locris, and Messenia were planted in Sicily and S. Italy. The small independent states of Greece needed a common bond of union. This bond was found in the Temple of Delphi, the Amphictyonic Council, and the solemn games, among which the Olympic were the most distinguished, the institution or rather revival of which, 776 B.C., furnished the Greeks with a chronological era. From this time, Athens and Sparta began to surpass the other states of Greece in power and importance.

At the time of the Persian War, Greece had already made important advances in civilization. Besides the art of poetry, we find that philosophy began to be cultivated 600 B.C., and even earlier in Ionia and Lower Italy than in Greece proper. Statuary and painting were in a flourishing condition. The important colonies of Massilia (Marseilles), in Gaul, and Agrigentum, in Sicily, were founded. Athens was continually extending her commerce, and established important commercial posts in Thrace. In Asia Minor, the Grecian colonies were brought under the dominion of the Lydian Crœsus, and soon after under that of Cyrus. Greece itself was threatened with a similar fate by the Persian kings Darius and Xerxes. Then the heroic spirit of the free Greeks showed itself in its greatest brilliancy. Athens and Sparta almost alone withstood the vast armies of the Persian, and the battles of Marathon, Thermopylæ, and Platæa, as well as the sea fights at Artemisium, Salamis, and Mycale, taught the Persians that the Greeks were not to be subdued by them.

Athens now exceeded all the other states in splendor and in power. The supremacy which Sparta had hitherto maintained devolved on this city, whose commander, Cimon, compelled the Persians to acknowledge the independence of Asia Minor. Athens was also the center of the arts and sciences. The Peloponnesian War now broke out, Sparta being no longer able to endure the overbearing pride of Athens. This war devastated Greece, and enslaved Athens, until Thrasybulus again restored its freedom; and, for a short time, Sparta was compelled, in her turn, to bend before the Theban heroes, Epaminondas and Pelopidas. In spite of these disturbances, poets, philosophers, artists and statesmen, continued to arise, commerce flourished, and manners and customs were carried to the highest degree of refinement; but that unhappy period had now arrived when the Greeks, ceasing to be free, ceased to advance in civilization.

A kingdom, formed by conquest, had grown up on the N. of Geece, the ruler of which, Philip, united courage with cunning. The dissensions which prevailed among the different states, afforded him an opportunity to execute his ambitious plans, and the battle of Chæronea, 338 B.C., gave Macedonia the command of all Greece. In vain did the subjugated states hope to become free after his death. The destruction of Thebes was sufficient to subject all Greece to the young Alexander. This prince, as generalissimo of the Greeks, gained the most splendid victories over the Persians. An attempt to liberate Greece, occasioned by a false report of his death, was frustrated by Antipater. The Lamian War, after the death of Alexander, was equally unsuccessful. Greece was now little better than a Macedonian province. Luxury had enervated the ancient courage and energy of the nation. At length, most of the states of S. Greece, Sparta and Ætolia excepted, concluded the Achæan League (*q.v.*), for the maintenance of their freedom against the Macedonians. A dispute having arisen between this league and Sparta, the latter applied to Macedonia for help, and was victorious. This friendship was soon fatal, for it involved Greece in the contest between Philip and the Romans, who, at first, indeed, restored freedom to the Grecian states, while they changed Ætolia, and soon after Macedonia, into Roman provinces; but they afterwards began to excite dissensions in the Achæan League, interfered in the quarrels of the Greeks, and finally compelled them to take up arms to maintain their freedom. So unequal a contest could not long remain undecided; the capture of Corinth, 146 B.C., placed the Greeks in the power of the Romans.

During the whole period which elapsed between the battle of Chæronea and the destruction of Corinth by the Romans, the arts and sciences flourished among the Greeks; indeed, the golden age of the arts was in the time of Alexander. The Grecian colonies were yet in a more flourishing condition than the mother country; especially Alexandria, in Egypt, became the seat of learning. As they, also, in process of time, fell under the dominion of the Romans they became, like their mother country, the instructors of their conquerors. In the time of Augustus, the Greeks lost even the shadow of their former freedom, and ceased to be an independent people, although their language, manners, customs, learning, arts, and taste spread over the whole Roman Empire. In 330 the seat of the Roman Empire was removed to Constantinople, an event which brought Greece into closer relations with the Roman administration. In 395 the separation the E. and W. empires took place; and as the Greeks naturally belonged to the E., they now exercised a more powerful influence on the government. The W. empire fell 476; but the E. continued, becoming more and more properly Byzantine. For the history of Greece during the period 395–1453 A.D. See BYZANTINE EMPIRE.

Modern Greece.—Nearly four centuries passed away, with only a few spasmodic efforts to break the Mohammedan yoke. In the last half of the eighteenth century the spirit of nationality and the desire of independence re-

ceived a strong impulse throughout the Hellenic race; and at length an insurrection broke out, 1821. Of several attempts, the revolt in the Peloponnesus was the most successful; the people found heroic chiefs in Bozzaris, the Mainote bey Mavromichalis and his sons, Canaris, Miaulis, Colocotronis, Odysseus, and others, and statesmen in Mavrocordatos, Colettis, and Negris. In 1822 a provisional constitution was framed, and a proclamation of independence published. The contest was carried on in the most barbarous manner by the Turks, and the Greeks here and there imitated the atrocities of their oppressors. At Missolonghi (1822-26) and numerous other places they showed themselves worthy of their Hellenic ancestors.

The battle of Navarino, October 20, 1827, in which the combined squadrons of England, France, and Russia annihilated the Turco-Egyptian fleet, was the decisive event. The sultan was compelled to come to terms. Count Capo d'Istria was chosen president, and acted, 1828-31, when he was assassinated. The Great Powers now occupied themselves with the settlement of Greece, and finally selected as king Otto, the second son of the King of Bavaria, a prince then (1832) only seventeen years old. He assumed the government under the direction of a regency, and arrived at Nauplia, 1833. After attaining his majority, 1835, the king governed in his own name, by ministers responsible to himself, aided by a Council of State. In 1843 an uprising took place; the palace was surrounded on the night of September 14th by the army and the people, demanding a constitution. After some hesitation the king yielded, and a political revolution was effected without violence. A national assembly was convoked, and the constitution drawn up by it was sanctioned by the king on March 16, 1844.

In 1847 a diplomatic difficulty, arising from an alleged discourtesy of the Turkish Ambassador at Athens, threatened to involve the government in a war with Turkey. In the next year a series of grave differences with England, arising out of demands made by her on Greece for damages sustained by British subjects (called the Pacifico claims, from the name of the principal claimant) under various circumstances, threatened disastrous results. In January, 1850, a British fleet appeared off Piræus, and, the demands of the English Ambassador not being complied with, proceeded to blockade Athens and to make many arbitrary seizures of Greek shipping. Greece was compelled to yield in order to avoid an actual war.

At the outbreak of the Crimean War Greece took a decided stand in favor of Russia; but the threats of England and France compelled the government to pledge itself to neutrality, and Piræus was guarded by English and French fleets, which were not removed till 1857, after many protests of the Greek Govt.

After several minor insurrections elsewhere against King Otto, who had become very unpopular, a revolution broke out in Athens, October 22, 1862; and on the 23d a provisional government was established by the leaders of the popular party. They immediately decreed the deposition of the king, and the calling of a National Assembly. The assembly met at Athens, December 22d, and confirmed the deposition of the Bavarian dynasty (February 16, 1863). On March 30th Prince George of Denmark was unanimously elected king by the assembly. The election was confirmed by the Great Powers, July 13th, and he took the oath to support the constitution, October 31st. In 1866 the Cretan revolution threatened to involve Greece in a conflict with Turkey on account of the assistance furnished the Cretans by blockade runners and of the asylum given to fugitives; but the danger was averted. The massacre by brigands of a party of English travelers, 1870, led to difficulties with the British Govt., which were amicably adjusted. In 1897 Greece went to war with Turkey because of massacres by the Turks in Crete, and was defeated; but the Great Powers forced Turkey to evacuate that island, and placed it under a high commissioner, Prince George, of Greece, by their joint selection.

Greek Church (also called the GREEK CATHOLIC, the ORTHODOX GREEK, the ORTHODOX, or the EASTERN CHURCH), that part of the Christian Church which adheres only to the doctrinal decrees of the first seven Ecumenical Councils (of Nice, 325; Constantinople, 381; Ephesus, 431; Chalcedon, 451; Constantinople, 553 and 680; and Nice, 787), of the so-called Quinisextum of Constantinople; held, 692, and of the council held at Constantinople under Photius, 879 and 880. A dogmatical difference between the Greek Church and the Church of Rome existed as early as the fifth century, growing out of the Monophysite controversy. The union was repeatedly interrupted by decisions of the emperors in matters of faith, against which the bishops of Rome protested. The adoption in the Western Church of an article which declared that the Holy Spirit proceeded from the Son as well as the Father (*Filioque*) awakened opposition in the Greek Church during the eighth century.

More serious than ever became the conflict between the two churches when the Patriarch Photius, whose accession, 858, was due to the influence of the court, was rejected by Pope Nicholas I as an intruder. At a synod convened by Photius at Constantinople, 867, the pope was excommunicated and deposed, and all relations between the two bodies were severed. The great schism was fully declared on July 16, 1054, when Roman legates deposited on the great altar of the Church of St. Sophia at Constantinople the sentence of excommunication which had been issued against the Patriarch Cærularius. A union between the two churches was consummated at the synod of Florence (1439), by the Greek emperor and the patriarch himself; but the people and the inferior clergy were entirely strangers to it, and the conquest of Constantinople (1453) made the hostility of the Greek Church to Rome still greater. The Roman Catholic Church succeeded in organizing a Greek United Church, which acknowledged the supreme authority of the pope, while it was permitted to retain marriage of the priests, reception of the Lord's

Supper in both kinds, use of the Greek language in the divine service, etc. In Russia, however, nearly all the dioceses of the United Greek Church were induced, under the reigns of Catharine II and of Nicholas, again to dissolve their connection with Rome; and, 1875, that church became almost entirely extinct in the dominions of the czar. The peculiar tenets of the Greek Church are mainly the following: It disowns the authority of the pope, and, in controversies of faith, acknowledges the infallibility of Ecumenical Councils. It administers the Lord's Supper in both kinds. It denies the existence of a purgatory, yet prays for the dead, that God would have mercy on them at the general judgment. It maintains that the Holy Ghost proceeds from the Father as principal, through the Son as medium. It admits of no images in relief or embossed work, but uses paintings and engravings in copper or silver. The Greek priest is required to marry once, but forbidden to marry twice. The churches are mostly built in the form of a cross; the altar stands toward the E.; the people stand during service; only one mass a day is said in each congregation, and that before sunrise; and instrumental music is forbidden in the churches. Stanley described the Greek worship as "a union of barbaric rudeness and elaborate ceremonialism."

With regard to church constitution, the Greek Church is made up of ten independent groups: 1. The Church of Constantinople, governed by a patriarch, who bears the title of "Most Holy Archbishop of Constantinople, New Rome, Ecumenical Patriarch." 2. The Church of Alexandria, under the Patriarch of Alexandria, who habitually resides at Cairo. 3. The Church at Antioch, under a patriarch. 4. The Church of Jerusalem, under a patriarch. 5. The Russian Church, governed by the "Most Holy Synod directing all the Russians," established by Peter the Great, and consists of three metropolitans. The czar is the virtual head. 6. The Church of the Island of Cyprus, under a bishop whose see is at Nicosia. 7. The Greek Church of Austria-Hungary, divided into three independent jurisdictions, with a metropolitan for the Serb nationality at Carlovitz, and another for the Roman nationality at Hermannstadt; and for the Greek Church of Cisleithan Austria, an archbishop at Czernowitz. 8. The Church of Mt. Sinai, under the Archbishop of Sinai. 9. The Church of Montenegro, with one bishop. 10. The Hellenic Church, in the kingdom of Greece, with thirty-one archbishops and bishops, governed by the "Holy Hellenic Synod" of Athens. In addition to these ten divisions, which recognize each other as orthodox, there are in Russia a number of sects, most of which fully acknowledge the doctrinal basis of the Greek Church, but reject the liturgy of the Russian Church as corrected by Patriarch Nicon (1654), and therefore keep aloof from any intercourse with the state church.

Greek Fire, inflammable compound, probably made of naphtha, saltpeter, and sulphur, and much used by the Byzantine Greeks in defensive and offensive warfare; but there is much doubt as to its composition. It was thrown on the enemy by means of a copper tube, or pledgets of tow were dipped in it and attached to arrows, which were discharged at hostile ships or towns. This material was also used in W. Europe and in Asia to some extent in the Middle Ages. Its invention was ascribed to Callinicus of Heliopolis, in Egypt, 668 A.D.; and it was first used by Constantine Pogonatus against the fleet of the Caliph Moawia at the siege of Constantinople, 673, with complete success. It is, however, generally considered an Arabian or an E. Indian invention. The use of similar compounds called by the name has been attempted in modern times without much success, the new plan being to throw them in shells or grenades.

Greek Lan'guage, vernacular of the inhabitants of Greece. It belongs to the Indo-European family of languages. Its chief characteristics are copiousness of inflection and vocabulary, and consequent capacity for fine distinctions, wonderful power of self-development, great vivacity, flexibility of expression, and freedom from arbitrary rules.

In the classic period the Greek language was by no means uniform. The dialectic variations were considerable, and we know only two, Ionic and Attic, through literary remains of any extent; of all the others, our knowledge depends chiefly on inscriptions. The number of dialectic inscriptions has greatly increased, and discoveries are constantly bringing more to light the astonishing multiformity of the Greek tongue. The traditional division of the dialects into Ionic, Doric, and Æolic, which has come down to us from the ancients, has been found inadequate. It is impossible to unite in a single group the six or more dialects which are neither Ionic nor Doric.

The Greeks received the letters of their alphabet from the Phœnicians, at what time is uncertain, but the earliest known inscriptions were not written before 650 B.C., and the Homeric poems make no mention of writing. The Phœnician alphabet of twenty-two signs ending with Τ, was increased by a new vowel sign Υ at the end, and later by the letters Φ, Χ, Ψ. The forms of the letters varied much at different times and places, but became fixed in the fourth century B.C. The letters at first were turned (Ǝ, Ꭓ), and the writing proceeded from right to left; this, however, was early reversed. The complete Ionic alphabet became general abt. 400 B.C., superseding the older alphabets. Breathings and accents were unused till long afterwards. Capitals only were known to the ancients; the cursive letters were developed in the mediæval period.

The Greek has five cases: Nominative, accusative, genitive, dative, vocative. The structure of the Greek verb is in several ways remarkable. First, in the number of significant variations of form; the Greek finite verb (excluding infinitives, participles, and all periphrastic forms) has about 250 different forms, in contrast with 94 of the Latin. Second, the Greek alone of all Indo-European languages has preserved intact the original distinction of the tenses. It never allows the perfect to become

a mere preterit, and it has, in its use of present and aorist, carefully kept up the distinction between continued and momentary action, which enables it, for example, to express directly such differences as "be ill" and "fall ill," "weep" and "burst into tears," which we accomplish only by circumlocutions. The Greek finite verb has three voices; besides the active and the passive, the *middle* voice, representing the subject as acting upon, for, or with himself. Besides the indicative and imperative moods, there are two oblique moods—subjunctive (conjunctive) and optative. The tenses fall into three groups. The distinction of time belongs to the indicative only; its seven tenses being thus classified:

	Continued.	*Momentary.*	*Completed.*
Present.	Present.		Perfect.
Past.	Imperfect.	Aorist	Pluperfect.
Future	Future.		Future Perfect.

The oblique moods do not distinguish time, and have three tenses only, the present for continued, the aorist for momentary, the perfect for completed action.

The accent of the Greeks is not, like ours, a stress on a particular syllable, but is an elevation in pitch. It is confined to the last three syllables of words. The ordinary tone of accented syllables is called *acute* (marked ′), and when it falls on long vowels extends to the end of the same. But long vowels in either of the two final syllables have sometimes the high tone restricted to the first half, the voice descending on the last half; this kind of accent is called *circumflex* (marked ◠). If the final syllable of a word be long, the tone can in no case stand further back than the end of the penultimate vowel; that is, the circumflex cannot stand on the penult nor the acute on the antepenult. The accent of most words is *recessive*, going as far back as this rule will allow; but in some words it adheres to the ultimate or penult. An acute at the end of a word is lowered in pitch if other words follow in close connection; so arises a third variety of tone, called *grave*, and marked ‵. Some short words (enclitics and proclitics) have no accent of their own, but lean, as it were, on the preceding or following word.

The structure of Greek sentences is natural and unfettered, giving rise to many colloquial idioms, and admitting many slight inconsistencies which are not looked upon as blemishes. The rules are singularly flexible, the variety of possible constructions very great. The Greek is the only language of the Indo-European family which, retaining both the subjunctive and optative formations, has kept them distinct, and made them the basis of different shades of modality. They have each two uses—a primary use, in which they have the force of a modified future (opt. of wishing, subj. of request); and a secondary use, in which they refer to indefinite frequency in present and past time respectively, the idea of futurity being given up; thus if he (ever) does (or did) this. The optative has yet another use in indirect quotations.

From the time of Alexander (330 B.C.) on, literary and political influences gave the Attic dialect ascendency over all others; it became the language of the whole Greek world. The other dialects gradually disappeared, first in public life and educated circles, last of all among the masses. The new universal speech took the name of *common dialect*, and was a slightly modified Attic. Outside of Greece, in Syria, Macedonia, Alexandria, the language was spoken with less purity, and many corruptions crept in. The language of the New Testament and the Septuagint is tinctured with such peculiarities. The process of decay went rapidly on after Byzantium was made the head of the Hellenic world. The cleft between the vulgar tongue and the language of the *literati* widened and Roman words were largely adopted. The written language, though clinging stoutly to ancient models, could not hold its own, and the spoken tongue verged gradually toward the Romaic or modern Greek.

Greek Lit'erature. There are four periods of ancient Greek literature: (1) The ancient or classical literature ending with Aristotle at the time of Alexander the Great; (2) the Alexandrian period, till the subjection of Egypt to Rome, 30 B.C.; (3) the Roman period, till the division of the empire, 330 A.D.; (4) the Byzantine period, till the capture of Constantinople, 1453. The last three are of subordinate importance.

I. THE NATIONAL CLASSICAL LITERATURE.—Greek literature began with the Homeric poems, the "Iliad" and "Odyssey," in which are found vivid word painting, musical flow of language, great wealth of expression, with an inimitable childlike simplicity. The "Iliad," Achilles its central figure, describes portions of the siege of Troy; the "Odyssey," the adventures of Odysseus on his return home from the siege. The origin of these poems has been in recent times the subject of much controversy. Few, if any, scholars now hold to the old view of absolute unity of authorship. Nor is it apparent when the poems were first committed to writing.

Hesiod, author of "Works and Days," a didactic poem on husbandry and the calendar, is a less indistinct personality than Homer; he is said to have lived at Ascra in Bœotia, at what time is uncertain. The "Theogony" ascribed to Hesiod is probably of different authorship, though of the same school.

Elegiac and Iambic forms of verse took their rise among the Ionians and flourished from abt. 680 to 500 B.C., but only scanty fragments of the poems of this period have been preserved. The Lesbians were responsible for the introduction of the *melos*, or song expressly composed for and inseparable from music. The former styles of poetry, though perhaps originally chanted in musical tones, had early freed themselves from such connection. The lyric poem, on the other hand, was always essentially musical. In Alcæus and the poetess Sappho, both Lesbians (abt. 600), the expression of individual thought and passion is predominant. The song is for a single voice with cithara accompaniment; the form, that of the short stanza, mostly of four lines; the subjects, erotic, convivial, even political; the dialect, their native Les-

bian. The choral lyric was first developed among the Dorians, who hitherto had taken no creative share in literature. Hence the dialect of choral poetry was always Doric. Simonides of Ceos (556–468 B.C.) attained the highest distinction in choral composition; his life was passed mainly in Athens. Another of the famous choral poets was Pindar, the only one from whom any complete poems have come down. He was about thirty-five years younger than Simonides, and a native of Thebes. Forty-five *epinicia*, or poems celebrating victors at the four national festivals, have come down entire.

Tragedy was a development of the choral lyric, and reached its highest expression in Athens, where it originated. The fifth century B.C. was its flourishing period, marked by the three great names of Æschylus, Sophocles, and Euripides. Æschylus (525–456), after his predecessors, Thespis, Phrynichus, and others, had made many advances, first gave the tragedy its complete form. Seven of his plays are preserved, the "Prometheus" and "Agamemnon" the best. Sophocles (496–406) has finer feeling for human nature, more dramatic life, greater versatility and power of affecting the sympathies. Modern critics rank him highest of the three. Seven of his plays are extant, of which the most powerful are the "Antigone," "Œdipus Tyrannus," and "Electra." A decline from this high standard is seen in Euripides (484–406). The sophistical tendencies of the age were unfavorable to poetry, and a falling off in poetic taste begins from this time. Euripides was very popular in subsequent ages, and eighteen plays of his have been preserved, besides many fragments.

The early history of the comedy is obscure. At Athens it was adopted by the state, as part of the public Dionysiac festival, abt. 460. Three phases of the Attic comedy are commonly distinguished the Old, Middle, and New Comedy. Old Comedy flourished from 450 to 400; the chief poets were Cratinus, Crates, Eupolis, and Aristophanes. Eleven plays of Aristophanes have been preserved. Farcical extravagance and the utmost license in personal satire are the characteristics of the Old Comedy; with this the most brilliant, though often the coarsest, wit. With the end of the Peloponnesian War the spirit of comedy changes; its farcical merriment is given up; political satire is now less its motive than the delineation of types of character and scenes of daily life. The Middle Comedy (400–338) was a transitional stage. The latest piece of Aristophanes, "Plutus," properly belongs to it. The chief poet was Antiphanes. The New Comedy had no chorus; its characters were types of everyday society; it stood very near the modern comedy.

Among the Greeks prose began long after poetry. The crude beginnings of historical composition were made by the Asiatic Ionians —attempts merely at preserving current reminiscences. The chief of these Ionic historians, and the only one whose works have come down, was Herodotus of Halicarnassus (b. 484), who undertook extensive journeys, and embodied the results of his inquiries in nine books of history, our chief source of information of the Persian wars and preceding periods, treating of almost all the known nations of the earth, and giving geographical and ethnological information, as well as historical. Thucydides, the greatest historian of Greece, was an Athenian (d. abt. 400). His work in eight books, treating of the Peloponnesian War down to 410, is a model of impartiality and conscientious research. A continuation of Thucydides's history is furnished by Xenophon of Athens (abt. 434–355), whose seven books of Grecian history ("Hellenica") extend to 362 B.C. Superior to this work in interest is his "Anabasis," a simple and graphic account of the adventures of the body of Greek mercenaries who joined the ill-fated expedition of the younger Cyrus against Artaxerxes.

No philosophical writings before Plato have been preserved, though the two preceding centuries had produced many such. The first beginnings of philosophy were contemporary with those of history, and the Ionians, as in history, took the initiative. The Ionic philosophers occupied themselves with speculations on the physical universe; Thales, Anaximander, Anaximenes were the earliest of these. A little apart from these stood Heraclitus (500), and later Anaxagoras of Clazomenæ (450), the most advanced philosophic thinker before Socrates. Special schools, offshoots of the Ionic, were formed by Pythagoras, a Samian who emigrated to Croton in Italy, and Xenophanes of Colophon, the founder of the Eleatic school in Elea; both of the sixth century. Pythagoras himself wrote nothing, but his followers expounded his doctrines in books. Entirely new ground for philosophic thought was obtained by the fearless thinker and uncompromising moralist Socrates (d. 399), who, though he wrote nothing, gave a direction to speculation which resulted in the establishment of several schools. The first of these, the Academy, was founded by the celebrated Plato (429–347) of Athens, an enthusiastic, imaginative, almost visionary nature, educated by extensive travel. His works are in the dialogue form, with Socrates as chief speaker. Probably all are preserved; besides the longer works, "Republic" (ten books) and "Laws" (twelve books), there are some forty shorter compositions, many of doubtful genuineness. Aristotle (384–322), the founder of the Peripatetic school in the Lyceum, was a pupil of Plato, but very unlike him. He was preeminently a man of facts; his eagerness for knowledge extended into every part of the physical and metaphysical universe. About half of his numerous writings are preserved.

Rhetoric and oratory reached their highest development in Athens, especially through the influence of the Sophists, who were rhetoricians rather than philosophers. With Demosthenes (384–322) was reached the highest point in oratory. Sixty orations bearing his name are preserved. His contemporaries, Lycurgus, Æschines, Hyperides, and Dinarchus, though able orators, were his inferiors in power. Speeches of all of these have been preserved. The famous contest on the Crown between Æschines and Demosthenes (330 B.C.)

gave occasion for the masterpieces of the two orators.

II. ALEXANDRIAN PERIOD (330–30 B.C.).—Its characteristics were great diminution of originality, the cultivation of science at the expense of literature, the study and dissemination of previous works. The boundaries of the Hellenic world were greatly enlarged, and foreign influences made themselves felt. The two centers of literary activity were Alexandria and Athens. Grammar, in its widest sense, including the study of literature, was ardently pursued, especially at Alexandria under the Ptolemies. The famous libraries there collected, and the Museum, a kind of academy of sciences, were important means. The advances made, especially at Alexandria, in astronomy, mathematics, and geography were remarkable. In mathematics were distinguished Euclid, whose "Elements of Geometry" hold their place even yet, and who lived in Alexandria about 300 B.C.; and later Archimedes of Syracuse, and Apollonius.

III. ROMAN PERIOD (30 B.C.–330 A.D.).—Literature centered at Rome, the ancient seats of learning lost their importance. The scientific spirit decreased, but there was returning taste for rhetoric and regard for form and style in composition, which had been generally neglected in the preceding period. To the first century of this period belongs Plutarch the biographer; the astronomer and geographer Ptolemy, and the physician Galen. The study of philosophy languished, and the Athenian schools died out; Epictetus the Stoic was the most eminent teacher. Philosophy degenerated on the one hand into the fantastic superstition of Neoplatonism, whose chief apostle was Plotinus; on the other into the skepticism of Sextus Empiricus (abt. 200 A.D.).

IV. BYZANTINE PERIOD (330–1453 A.D.).—The literary center was Constantinople. A brief renaissance of poetry and rhetoric was followed by a long decline, in which all originality died out. Many works of antiquity were forgotten and lost; careless compilations and excerpts replaced original works. The writers of this period had, for the most part, scant literary merit. Of ecclesiastical writers who flourished in this period, the most eminent were Justin Martyr, Clement of Alexandria, Origen, Eusebius, Gregory, John Chrysostom; the first three belong chronologically to the preceding period.

Greel'ey, Horace, 1811–72; American journalist; b. Amherst, N. H.; learned the printer's trade in E. Poultney, Vt.; settled in New York City, 1831, and worked as a journeyman till 1833, when, with a partner, he became the printer of the *Morning Post*. In 1832–41 he edited *The New Yorker*, a literary weekly celebrated for the accuracy of its political statistics. In 1840 he edited the *Log Cabin*, a Whig campaign weekly. On April 10, 1841, he issued the first number of the *Daily Tribune*, which started with 500 subscribers, and in the autumn of 1841 the *Weekly Tribune*. He was elected to Congress, 1848, to fill a vacancy, and during his brief term distinguished himself by exposing the abuses of the mileage system. In the beginning of the Civil War he favored the secession of the S. states, provided a majority of their inhabitants voted for that course. When hostilities began, he demanded their vigorous prosecution. At the close of the war he advocated universal amnesty with universal suffrage. In May, 1867, he signed the bail bond of Jefferson Davis, thereby incurring popular censure. On May 1, 1872, a convention of liberal Republicans at Cincinnati, who were dissatisfied with the administration of Pres. Grant, nominated him for President and B. Gratz Brown for Vice President. The Democratic convention, which met at Baltimore in July, adopted these candidates and their platform. Mr. Greeley retired from the editorship of the *Tribune* in July, and traveled and spoke in various parts of the country. Although not successful in the election, he carried the states of Georgia, Kentucky, Maryland, Missouri, Tennessee, and Texas. Shortly afterwards he died from a disorder of the brain. His funeral was perhaps the most impressive ever witnessed in New York. His published volumes are "Hints toward Reforms," "Glances at Europe," "History of the Struggle for Slavery Extension," "Overland Journey to San Francisco," "The American Conflict" (a history of the Civil War), "Recollections of a Busy Life," "Essays Designed to Elucidate the Science of Political Economy," and "What I Know of Farming."

Green, John Richard, 1837–83; English historian; b. Oxford; was made curate of St. Barnabas's, London; two years later became vicar of St. Stephens's, Stepney, and, later, librarian at Lambeth, where he wrote his famous "Short History of the English People." This was followed by a "History of the English People," "The Making of England," and "The Conquest of England."

Green, Samuel, 1615–1702; American printer; b. England; succeeded Day in the printing house at Cambridge, Mass., abt. 1648; printed the "Cambridge Platform," 1649, and the Bible and other books in the Indian language.

Green, Seth, 1817–88; American pisciculturist; b. Rochester, N. Y.; devoted his life to methods of improving the yield of fish from spawn, and in increasing the product of fisheries in the U. S.; appointed one of the fish commissioners of New York, 1868; soon afterwards was made superintendent of fisheries. The introduction of shad on the Pacific coast was due to his efforts; published "Trout Culture" and "Fish Hatching and Fish Catching."

Green'away, Kate, 1846–1901; English artist; b. London; first drawings were for birthday and New Year cards and for children's magazines; exhibited annually after 1868; first "Kate Greenaway book" was "Under the Window," 1879; her work soon gained a wide reputation, and the dress of her children became the model for children's attire in England, France, and the U. S.; besides her own books, she illustrated "Pied Piper of Hamelin," "Marigold Garden," "The Language of Flowers," "A Day in a Child's Life," "Little Ann," "Mother Goose," "Birthday Book," and "Mavor's Spelling Book."

Green'back Par'ty, political organization in the U. S., formed 1876; outgrowth of the Granger and Labor Reform agitation; nominated Peter Cooper for President, 1876, and James B. Weaver, 1880; had no electoral votes either time; platform demanded unconditional repeal of the Specie Resumption Act, issue of U. S. notes for circulating medium, and abolition of bank paper.

Greenbacks, name applied during the Civil War in the U. S. to notes, bonds, and forms of paper currency issued by the National Govt. and printed in green ink. See CURRENCY.

Green Bay, extension of the NW. part of Lake Michigan; 140 m. from NNE. to SSW., and nearly 30 m. in average breadth; water about 500 ft. deep, and of a green color; to the NE. the Great and Little Bays de Noquet are its continuations.

Green Bay, capital of Brown Co., Wis.; on the Fox River, at the head of Green Bay; 65 m. NNE. of Fond du Lac; at the terminus of the ship canal connecting the Mississippi River with Lake Michigan, using the Wisconsin and Fox rivers, built by the U. S. Govt. at a cost of over $10,000,000; has freight and passenger steamer connection with all lake ports; is the farming, mining, and lumbering trade center for NE. Wisconsin and the Michigan peninsula; contains St. Joseph's Orphan Asylum, Brown County Insane Asylum, St. Vincent's Hospital, general offices of several railroads, and valuable mineral springs. Pop. (1906) 23,688.

Green'brier, river in W. Virginia; rises in lat. 38° 40′, and flows SW. parallel to the main ridge of the Alleghanies, on the W. slope of which its valley lies between that ridge and the secondary ridge of the Greenbrier Mountains. In about lat. 37° 40′ it unites with New River, which, running nearly N., unites with the Gauley and forms the Great Kanawha. These rivers and their valleys constitute the trans-Alleghany portion of the James River and Kanawha Canal route between tide water and the great valley of the Mississippi.

Greenbrier Moun'tains, ridge in W. Virginia parallel to the main Alleghanies, and lying NW. of them, continuous S. with the Great Flat Top, and N. with Shaver Mountains.

Green Cove Springs, capital of Clay Co., Fla.; on the St. John's River; 30 m. S. of Jacksonville; has a celebrated sulphur spring, much resorted to for the cure of rheumatic troubles, and believed by many to be the "fountain of youth" vainly sought by Ponce de Leon. Pop. (1905) 1,077.

Greene, Nathanael, 1742–86; American army officer; b. Warwick, R. I.; was elected to the General Assembly, 1770, and in May, 1775, appointed brigadier general and commandant of the Rhode Island contingent in the army before Boston; joined his command at Roxbury, June 3d, and from that time remained in active service till the disbandment of the army, 1783. In September, 1776, he was made major general, and appointed to the command in New Jersey. At Trenton he led the division with which Washington marched. He took part in the battle of Princeton, and commanded a division at the Brandywine and the left wing at Germantown.

In 1778–80 he was quartermaster general. At Monmouth, 1778, he commanded the right wing. He took an active part in the attempt on Newport, commanding the right wing in the battle of Tiverton heights. On June 23, 1780, he checked with two brigades and a small body of militia the advance of a corps of 5,000 of the enemy, in the brilliant battle of Springfield. He was in command of the army during Washington's visit to Hartford, September, 1780, and sat as president of the court of inquiry on Major André. On October 14th he was appointed commander of the S. army, and in December began a series of operations which in less than a year stripped the enemy of nearly all their conquests in the Carolinas and Georgia, and shut them up in Charleston and its immediate neighborhood. Congress presented him with a medal for the battle of Eutaw Springs (September 8, 1781). The Carolinas and Georgia made him valuable grants of property; and after the war he settled on the Savannah River.

Green Eb'ony, S. American tree of the family *Bignoniaceæ*; wood quite hard and olive green in color; used by dyers, and gives yellows, browns, and greenish tints; is used also in turnery and joiner work; other species of the genus yield medicinal agents.

Green'finch, or **Green Lin'net,** bird of the family *Fringillidæ*, found throughout a large part of the E. hemisphere. It is often kept as a cage bird, but is a poor songster; is also called the green grosbeak; feeds on both seeds and insects.

Green'head. See MALLARD.

Green'heart, tree of the laurel family, native of Guiana; yields the bebeeru bark, a tonic and febrifuge; its seeds yield starch, used as food by the natives. The timber is exported; is very heavy and durable, takes a high polish, is used in turnery, and was formerly much used for shipbuilding.

Green'house, glass structure designed to afford an artificial climate in which tender plants may be grown in countries or seasons too cold for their unprotected growth. The simplest structures of this kind are the cold frames or hotbeds, used by market gardeners for forcing the early maturity of vegetables. Cold graperies, conservatories, orchard houses, bark stoves, forcing houses, etc., are among the varieties. Originally the name *greenhouse* was applied more especially to those whose winter temperature is just high enough to keep tender plants alive, or perhaps to produce from the flowering kinds some blossoms, but not enough to stimulate growth; but the term is usually applied indiscriminately to glass plant houses, especially in the U. S. When a greater heat than this is kept up in winter the structure is called a hothouse. In the best constructed greenhouses heat is supplied from iron pipes, through which steam or hot water is conducted. See NURSERY.

Green'land, large island belonging to Denmark; area about 500,000 sq. m. Its insularity was established (July, 1892) by Robert E. Peary, U. S. N., who discovered that a strait, believed to be Nordenskiold Inlet, stretches from Lincoln Sea on the W. to the Arctic Ocean on the NE. coast of Greenland. The N. limit of the mainland extends only a little N. of the 82d parallel. N. of the mainland is an archipelago of unknown extent. The greatest length of the island from Cape Farewell in the S. to Nordenskiold Inlet in the N. is about 1,400 m. The broadest part, in N. Greenland, is about 700 m. wide. The island is entirely under Arctic conditions. The only parts of its coast line still wholly unknown are the NE. coast, between Independence Bay (81° 37′ N. lat., 34° W. lon.) and Cape Bismarck, the SE. coast, between the 67th and the 69th parallels, and the NW. coast along the shores of Melville Bay. The Danish possessions on the W. coast are divided, for administrative purposes, into two inspectorates: N. Greenland, consisting of the districts Upernavik, Omenak, Ritenbenk, Jakobshavn, Christianshaab, Egedesminde, and Godhavn; and S. Greenland, consisting of the districts Holstensborg, Sukkertoppen, Godthaab, Frederikshaab, and Julianehaab. The entire Danish coast not covered with glaciers is estimated at about 34,300 sq. m., or nearly as large as Iceland. The population (1901) was 11,893, including about 300 Europeans. The only settlement on the E. coast is Angmagsalik, lat. 65° 37′ N., where, 1894, Capt. Holm, of the Danish navy, established a trade, missionary, and meteorological station, which is maintained by the Danish Govt. All the Danish possessions in Greenland are closed to the trade of other nations.

Greenland was discovered by the Northman Gunnbjörn, who saw its E. coast, 876 or 877. In 983, Eric the Red, son of a jarl of Jadar in Norway, doubled Cape Farewell and sailed up the W. coast to the present site of Julianehaab. He named the country Greenland, and the inlet Ericsfiord. In 985 he returned to Iceland, and again set sail with twenty-five ships loaded with emigrants and the means of founding a colony. He reached Ericsfiord with fourteen ships (the rest having been lost or forced to put back), and built a settlement. Eric found no indigenous race, and he and his followers became the sole tenants of the land. The several settlements around Ericsfiord were called collectively Östre Bygd (East country), and the more northerly plantations Westre Bygd (West country). At one time there were more than 300 farms and villages between Disco and Cape Farewell. Churches and monasteries were built, and in the twelfth century Greenland was erected into a bishopric. The last bishop was consecrated, 1406, and the see was abandoned, 1409. Abt. 1420 a hostile fleet destroyed what remained of the colonies, and their very sites were unknown till within a few years. In 1576 Martin Frobisher came in sight of the E. coast in lat. 61°, and rounded Cape Farewell. Other navigators followed. In 1721 the Danish missionary Hans Egede established himself at Godthaab. The Moravian missions were founded soon after, and the settlements have since continued to grow.

Denmark's explorers have systematically studied the W. coast as far N. as Upernavik since 1876. The explorers who have helped to outline the NW. shore line are Inglefield (1852), Kane (1853–55), Hayes (1860–61), Hall (1871–73), Nares (1875–76), and Greely (1881–83), during whose expedition a point within 386 m. of the north pole was attained, about 4 m. beyond the highest latitude hitherto reached. The Danes and Germans have studied the border regions of the ice cap. Hayes, Whymper, Nordenskiold, Jensen, and Peary made short journeys on the ice cap before Nansen (1888) crossed it S. of the Arctic Circle, sledging 260 m.; and Peary (1892) crossed it in N. Greenland, sledging 1,300 m. to and from his winter camp.

Green'leaf, Simon, 1783–1853; American jurist; b. Newburyport, Mass.; was reporter of the Supreme Court of Maine, 1820–32, publishing nine volumes of reports, and Prof. of Law in Harvard, 1833–48; principal works, "Overruled, Denied, and Doubted Decisions and Dicta" (three vols.), "Treatise on the Law of Evidence" (three vols.), and "Examination of the Testimony of the Four Evangelists, by the Rules of Evidence as Administered in Courts of Justice, and an Account of the Trial of Jesus."

Green Moun'tain Boys, an organized band of settlers in Vermont, formed in 1773 to resist the encroachments of the New Yorkers, who claimed Vermont as part of the territory of that state under the charter of Charles II.

Green Mountains, part of the Appalachian chain, constituting an important range in Vermont and Massachusetts, and continued S. in the hills of W. Connecticut and the Highlands of New York. The Taconic range of Massachusetts, New York, and Connecticut is an outlying W. parallel range. NE. the Green Mountains pass into the Notre Dame Hills of Canada, and are traceable at least as far as the Gulf of St. Lawrence. The highest points are Mt. Mansfield (4,389 ft.), Camel's Hump (4,188 ft.), and Killington Peak (4,380 ft. in height). The range contains marble, iron, slate, and some copper and gold. The country is generally a rich pastoral region, with valuable water power and abundant forests, consisting of pine, hemlock, fir, spruce, etc. The summits of the mountains are rounded and grassy.

Greenough (grēn'ō), **Horatio,** 1805–52; American sculptor; b. Boston, Mass.; spent the greater part of his life after 1825 in Florence, Italy; works comprise portrait busts, the colossal statue of Washington in front of the National Capitol, "Medora," "Venus Victrix," "Angel Abdiel," and "The Rescue," representing an American settler grappling an Indian, ordered by the U. S. Govt., and erected in Washington.

Green Riv'er, river in Kentucky; rises in Lincoln Co., and pursues a devious NW. course, uniting with the Ohio 6 m. above Evansville,

Ind.; is navigable at high water 200 m. by means of locks and dams. The mouth of the Mammoth Cave, at an elevation of 225 ft. above, is about a quarter of a mile from this river, a subterranean communication from which constitutes the famous "river" of that cave. Also the name of a river of Utah; rises in W. Wyoming, and flows in a generally S. course into Utah; with Grand River, constitutes the Rio Colorado of the West; drains a large portion of Utah E. of the Wahsatch Mountains, and a large area in NW. Colorado.

Green'sand, sandstone or sand containing a large amount of the green mineral glauconite, a hydrous silicate of iron and potassium. The word has also been used as the proper name of several formations of Cretaceous age. In England the Upper Greensand and Lower Greensand, separated by the Gault formation, fall in separate divisions of the Cretaceous, the Cenomanian, and Neocomian. In New Jersey the upper marl beds of the Cretaceous are sometimes called the Greensand.

Green'shank, wading bird of the group known as tattlers; remarkable for its wide geographic range, being found in Asia, Europe, and N. America, but rather rare in the U. S.; is as large as a woodcock, and has a much longer bill and legs.

Green Snake, name applied to several harmless serpents of the U. S. *Cyclophis vernalis* is the little green or grass snake, very common throughout a large part of the U. S. *C. æstivus* is a long, slender tree snake, of the S. states, golden green above, whitish yellow beneath; the genus to which these belong is rather closely related to *Coluber*.

Green'stone, name formerly used for massive rocks of greenish color, due principally to the presence of green hornblende, chlorite, and epidote. The rocks to which it was applied are more or less altered forms of syenite, diorite, gabbro, or diabase.

Green Tur'tle, large sea turtle (*Chelone midas*), so called from the brownish-olive color of the upper parts; head is small, the feet, as in other marine turtles, modified into flippers; is found in the tropical or warm seas of both hemispheres; and is particularly abundant in the W. Indies and at Ascension Island; attains a weight of from 300 to 500 lbs., but those of this weight are not common. It feeds on seaweed, and its flesh forms the basis of the well-known turtle soup. Green turtles are brought to market in large numbers, and, as they live for a long time without food, are readily transported.

Greenwich (grĕn'ĭj), parliamentary borough of England; in the counties of Kent and Surrey; on the Thames; contains several establishments for the building of iron steamers and the manufacture of machinery. The celebrated Royal Observatory of Greenwich, erected by Charles II for Flamsteed, stands upon an eminence in the fine park. The longitude reckoned on all British charts, and also on those issued by the Government of the U. S., as well as on many of those published in other countries, is computed from this observatory, which is 2° 20′ 23″ W. from the observatory of Paris and 18° E. from the meridian of Ferro. The Royal Naval College, formerly known as the Greenwich Hospital, a splendid range of buildings, is also situated in Greenwich. Behind the college is the Royal Hospital School, in which sons of petty officers and seamen are boarded. Among charitable institutions are the Norfolk or Trinity College, the Greencoat and Bluecoat schools, and the Jubilee almshouses. Pop. (1901) 185,149.

Green'wood, Francis William Pitt, 1797–1843; American clergyman; b. Boston, Mass.; was pastor of the New South Church in Boston, and afterwards edited for a time, at Baltimore, a periodical, the *Unitarian Miscellany*. In 1824 he became the colleague, in King's Chapel, Boston, of Dr. James Freeman, who had revised the "Book of Common Prayer" there used, so as to exclude the recognition of the Trinity, and, 1827, succeeded him as pastor. He devoted much attention to the natural sciences, especially conchology and botany. His works include "Sermons of Consolation," "History of King's Chapel," and "Lives of the Twelve Apostles."

Greer, James Augustin, 1833–1904; American naval officer; b. Cincinnati, Ohio; entered the navy, 1848; commanded the *Benton* at the passage of the Vicksburg batteries on the night of April 16, 1863; in the five hours' heavy engagement with the Grand Gulf batteries on April 27th of the same year; and in the operations on the Mississippi River until the fall of Vicksburg, July 4, 1863. In many of the engagements the *Benton* carried the flag of Rear Admiral Porter, which made her a conspicuous target. In 1873 he commanded the *Tigress* in the search for the missing Arctic exploring steamer *Polaris*; chairman of the Lighthouse Board, 1891–95; rear admiral, 1892; retired, 1895.

Grégoire (grā-gwär'), **Henri,** 1750–1831; French revolutionist; b. Véleo; was a parish priest, and, being nominated by the clergy of Lorraine, 1789, to represent them in the States-General, at once took ground as a Republican. Under the new constitution of the clergy, 1792, he became Bishop of Blois. In the Convention he led the movement for the abolition of the regal office, and was made its president. Being absent on the trial of the king, he urged his condemnation by letter, but afterwards denied that he wished him to be condemned to death. When Gobel, Archbishop of Paris, assented to the worship of Reason, Grégoire boldly refused to follow his example. He formed one of the minority of five in the Senate who opposed the accession of the First Consul to the throne. He alone opposed the reëstablishment of titles of nobility. Napoleon, on the request of both houses of the legislature, made him a count. On the second Restoration he was excluded from the Institute and deprived of his bishopric, and retired to Auteuil, where he passed the last fifteen years of his life in literary labor. He never renounced his Republican principles, and his character has been described in saying that he wished to "Chris-

tianize the revolution." His numerous publications include works on church history and religious literature; "De la Littérature des Negres," containing sketches of distinguished negroes (translated into English); and "Mémoires."

Grego'rian Cal'endar. See CALENDAR.

Gregorian Mu'sic, method of church singing founded on the musical reform of St. Ambrose in the fourth century. He made use of the four original Greek modes—the Dorian or scale of D, the Phrygian or scale of E, the Lydian or scale of F, and the Myxolydian or scale of G, all formed of natural notes without sharps or flats. These were the *authentic* modes of the Ambrosian chant. Two centuries later St. Gregory, then pope, found the Ambrosian chants so overlaid with fanciful embellishments as to be unfitted for the solemnity of divine worship. These he pruned, and collected such fragments of psalmody and hymns as were suitable for church use. His greatest improvement, however, was the introduction of four new scales, by commencing on the fourth degree below the lowest note of the corresponding authentic mode. These derived scales were called plagal, relative or collateral.

The Phrygian so far resembles the modern minor mode as to possess a certain plaintive and mournful character; the Dorian, though strongly minor in its general cast, is expressive of dignity, grandeur, and solemnity; the Myxolydian, closely approaching our G major, suggests peace, serenity, and joy; while the Lydian, with its irregular fourth occasionally corrected, has the gentle and soothing tranquility of many modern pieces in F major.

In each of the scales short chants or melodies for the psalms were prepared, and are known as Gregorian tones. These consist of two strains each, the latter of these strains having several "endings." In each tone a certain note called the *dominant* is more frequently used than the others, and is the reciting note in chanting. Preceding the dominant are two or more notes called the *intonation*. Other portions are the recitation, mediation, and cadence. There is no rhythmic division into bars, and the notes do not express exact measures of duration. One of the reforms initiated by the present pope (Pius X) was the restoration of Gregorian music in the service of the church.

Greg'ory, name of sixteen popes, the most important of whom follow: GREGORY I (surnamed "THE GREAT"), Saint, abt. 550–604; b. Rome; succeeded Pelagius, 590; labored day and night to stay the ravages of pestilence and famine; reformed abuses in the clerical body; sent missionaries to all parts of the known world; extinguished Arianism in Lombardy; put down the Donatists in Africa; won over to orthodoxy the Spanish King Recared; deplored the evils of slavery and emancipated his own slaves; would have no other means of spreading the faith employed than an exemplary life and rational instruction; and introduced the Gregorian chant. GREGORY VII (HILDEBRAND), Saint, abt. 1018–85; b. Tuscany; succeeded Alexander II, 1073; undertook to purge the priesthood of simony and unchastity, but the Emperor Henry IV made no scruple or secret of selling ecclesiastical livings to the highest bidder, both in Germany and Italy; held a council which enacted that all persons guilty of simony should be excommunicated and all married and unchaste priests should be degraded from office; Henry was summoned to Rome to answer for his conduct, but called a council at Worms, 1076, which excommunicated Gregory, who then excommunicated the emperor and declared his crown forfeited, and Rudolph of Swabia was elected in his stead; Henry sued for pardon, humbled himself before the pope, was absolved, and regained his crown. In 1081, Henry set up Guibert, Archbishop of Ravenna, as antipope; entered Rome; caused Gregory to flee to the fortress of Sant' Angelo; and enthroned Guibert as Clement III. Robert Guiscard soon after drove Henry and Clement from Rome, but Gregory's health was hopelessly broken, and he died in Salerno. GREGORY XIII (UGO BUONCAMPAGNI), 1502–85; b. Bologna; succeeded Pius V, 1572; had been a distinguished lawyer and Prof. of Civil and Canonical Jurisprudence; endowed several colleges in Rome, and reformed the Julian calendar. GREGORY XV (ALESSANDRO LUDOVISIO), 1554–1623; b. Bologna; succeeded Paul V, 1621; founded the celebrated College de Propaganda Fide; canonized Ignatius Loyola, Francis Xavier, Philip Neri, and Teresa; endeavored to end the persecution of the Protestants in Valtellina. GREGORY XVI (MAURO COPELLARI), 1705–1846; b. Belluno; had been cardinal, prefect of the College de Propaganda Fide, and examiner of bishops; after election had long controversy with Prussia concerning mixed marriages; protested against the oppression of Polish Catholics by the Russian Govt.; gave great impulse to the study of the sciences and fine arts in Rome; founded several establishments of public beneficence and utility.

Gregory, James, 1638–75; Scottish mathematician; b. Drumoak, Aberdeenshire; invented the Gregorian reflecting telescope when twenty-four years old; studied at Padua and there published "The True Quadratures of the Circle and Hyperbola," "Universal Geometry," and "Exercises in Geometry"; invented many important mathematical processes; Prof. of Mathematics, St. Andrews, 1668–74, and at Edinburgh, 1674–75.

Gregory, Olinthus Gilbert, 1774–1841; English mathematician and miscellaneous writer; b. Yaxley, Huntingdonshire; became in 1802 a master, and 1807–38 Prof. of Mathematics at the Royal Military Academy, Woolwich. His "Lessons, Astronomical and Philosophical" was published when he was but nineteen years old. He was also author of several mathematical text-books; "Letters on the Evidences of Christianity," etc.

Gregory the Illu'minator, Saint, apostle of Armenia, in regard to whom the old authorities are hardly to be trusted. The story is that he belonged to the royal family of the

Arsacidæ, who nominally ruled Armenia, 149 B.C.–428 A.D.; that he was born abt. 258; that when two years old he was taken to Cæsarea, Cappadocia, where he was brought up in the Christian faith, and whence he returned as a missionary to Armenia abt. 286; that he baptized the king, Tiridates III, 289; that, 302, Leontius of Cæsarea ordained him Patriarch of the Armenian Church; that, 331, he retired to a cave and lived till 332 A.D. His "Homilies were published at Constantinople, 1737. Many "Prayers" in the Armenian liturgy and thirty "Canons" are also ascribed to him.

Gregory Nazian'zen, Saint, abt. 325–90; a father of the Greek Church; b. near Nazianzus, Cappadocia; son of the bishop of the place; ordained a presbyter, 361; consecrated Bishop of Sasima, 372; went to Constantinople as the champion of a persecuted orthodoxy, 379; became pastor of a congregation of Nicene Christians; was made Bishop of Constantinople, 381, but the election was protested against, and he returned to Cappadocia.

Gregory of Nys'sa, Saint, abt. 335–95; Eastern Churchfather; b. probably at Cæsarea, Cappadocia; younger brother of Basil the Great. In 362 he entered Basil's monastery in Pontus. In 372 Basil became Metropolitan of Cæsarea, and obliged Gregory to become Bishop of Nyssa (now Nirse), an obscure town in Cappadocia. Bitterly persecuted by the Arians, he was deposed and banished, 376, but was restored, 378, to his see, where he died. He wielded a powerful influence and was favored by the imperial court. He delivered the inaugural address at the Ecumenical Council of Constantinople, 381. He was one of the clearest and strongest champions of the Nicene Creed, but in eschatology was a restorationist.

Gregory of Tours (tôr), **Saint** (originally *Georgius Florentius*), 538–93; Frankish historian; b. Arverni (now Clermont), Auvergne; was of a noble Roman family, and after his conversion took the name of Gregory out of regard for his mother's grandfather, the Bishop of Langres. Abt. 573 he became Bishop of Tours, and died there. His principal work is "A History of the Franks," which has earned for him the title of "Father of French history."

Gregory Thaumaturgus (thâ-mä-tėr'gŭs), **Saint,** abt. 210–70; a father of the Eastern Church; b. Neocæsarea, Pontus, Asia Minor; was of heathen parentage and originally called Theodore; became a Christian at the age of fourteen; studied under Origen at Cæsarea, Palestine; was made Bishop of Neocæsarea, 240; was said to perform miracles (chiefly of exorcism); wrote "The Oration and Panegyric Addressed to Origen; an important "Confession of Faith," etc.

Grell, August Eduard, 1800–86; German musician; b. Berlin; was director of the Sing-Akademie for over twenty years; and was connected with that institution in various ways for nearly sixty years. His compositions, entirely vocal, and for the most part sacred, include an oratorio, "Die Israeliten in der Wüste," a "Te Deum," psalms in eight and eleven parts, motets, cantatas, and a polyphonic mass in sixteen parts *a capella*.

Grellet', Stephen, (original name, *Étienne de Grellet de Mabillier*), 1773–1855; American preacher in the Society of Friends; b. Limoges, France; educated in the Roman Catholic faith; became one of the king's bodyguard, but escaped sentence of death at the Revolution; emigrated to New York, 1795, and there joined the Society of Friends, and after 1800 made preaching journeys all over the U. S. and Europe.

Grena'da, one of the British W. Indian islands; the southernmost of the chain on the E. side of the Caribbean Sea; 68 m. S. of St. Vincent; area, 133 sq. m. More than three fourths of the inhabitants are Negroes or mulattoes. The surface is mountainous, several peaks exceeding 2,300 ft., and one attaining 2,800 ft. Cacao, nutmegs, and sugar are the principal exports. The climate is temperate and healthful. Pop. (1904) 68,250; capital and principal town St. George's. Grenada was settled, 1651, by the French, who conquered the Carib inhabitants after a fierce war. It was taken by the British, 1762, retaken by the French, 1779, and ceded to Great Britain by the peace of 1783; several subsequent revolts of the French inhabitants were put down with much bloodshed. Grenada forms part of the British colony of the Windward Islands, and is the residence of the governor. Carriacou, the farthest S. of the Grenadines (11 sq. m.; pop. 7,120), is attached to it.

Grenade (grē-nād'), small shell, usually of iron, charged with powder and thrown into a mass of attacking troops by the garrison. They have a straight fuse, and are thrown by hand or rolled into the trench by a wooden trough or spout. When first used they were fired from a musketoon. For the modern hand grenade see FIRE EXTINGUISHER.

Grenadier (grĕn-ä-dēr'), in some armies a soldier of the first company of a battalion of foot troops. Grenadiers are chosen for their tall stature and fine appearance. The first regiment of British foot guards is called the Grenadier Guards. The grenadiers at first threw grenades.

Grenadines (grĕn-ä-dēnz'), group of small islands in the W. Indies; between St. Vincent and Grenada, from which they are separated by deep channels. The largest are Becquia, Canauan, Mustique, Union, and Carriacou; the latter is politically attached to Grenada, the others to St. Vincent, and all are included in the British colony of the Windward Islands. Total area about 55 sq. m.; pop. abt. 10,000. Sugar is the principal agricultural product; cattle and horses are raised on Mustique; and the whale fisheries are of considerable importance. Admiralty Bay, in Becquia, is one of the best harbors in the W. Indies.

Gren'fell, Wilfred T., 1865– ; English surgeon; b. near Liverpool, of eminent family; educated at Marlborough College and Oxford; for some years superintendent of the "Deep

Sea Mission" in the North Sea; since 1892 mariner missionary among the fishermen of Labrador and The Banks; has established six hospitals, besides several hospital ships, an orphanage, a fisherman's institute, workshops, eight coöperative stores, day and night schools, and, with Carnegie's aid, 60 circulating libraries; has replaced sledge dogs by 300 reindeer imported from Norway; installed his own electricity, telegraph, and telephone; sounded, explored, and charted the entire seaboard. Dr. Grenfell travels from 3,000 to 4,000 m. in summer and 2,000 m. in winter, dispensing medical aid, provisions, and hunting and fishing gear; rescuing stranded vessels, and holding regular religious services—at the same time managing the finances of his various enterprises and writing, to swell his funds, a daily diary for a number of newspapers. With an official salary of $1,500 a year he makes up out of his own pocket most of the losses of his work, turning over all profits to the mission. The annual cost of the work, $40,000, is met by voluntary gifts, which amount, approximately, to $15,000 from England, $15,000 from the U. S., $7,000 from Canada, and $3,000 from Newfoundland.

Grenoble, town of France, department of Isère, on the Isère; 59 m. SE. of Lyons; is fortified, and celebrated for its manufactures of gloves, hats, hardware, cement, liqueurs, brandies, and perfumes. It contains a cathedral built in the fifteenth century. In the museum is a fine and extensive collection of works of art. The educational institutions include a university and a school of forestry. Pop. (1906) 73,022.

Gren'ville, George, 1712–70; English statesman; entered Parliament, 1741; Treasurer of the Navy, 1754; was a Secretary of State, 1762; First Lord of the Admiralty, 1762; First Lord of the Treasury and Chancellor of the Exchequer 1763–65. His administration is noted for the prosecution of Wilkes and the passing of the Stamp Act, which constituted one of the grievances of the American colonies.

Grenville, or **Gran'ville, Sir Richard,** 1540–91. English naval officer; a relative of Sir Walter Raleigh; entered Parliament, was made high sheriff of Cornwall, 1571, and knighted abt. 1577; assisted Raleigh in planting the Roanoke colony, 1585; vice admiral, 1591; attacked a Spanish fleet of 53 vessels with only 6 ships, 1591; sunk 4 ships, and after being twice wounded was taken prisoner, and died soon afterwards.

Grenville, William Wyndham (Lord), 1759–1834; English statesman; son of George Grenville; was elected to Parliament, 1783, and, 1789, was chosen Speaker of the House of Commons. He was soon afterwards appointed Secretary of State for the Home Department, and, 1790, on being raised to the peerage, took his seat in the House of Lords; was Foreign Secretary, 1791–1801, resigning with Pitt, when the king opposed the project of Roman Catholic emancipation. In 1806 he became the head of the ministry of "all the talents." The demand of the king that no steps should be taken toward Roman Catholic emancipation caused the resignation of the ministry, 1807.

Gresh'am's Law, the law by which when one of the two metals used in the currency of a country becomes cheaper for any reason, this metal tends to drive out of circulation the dearer metal. People having in their possession quantities of the dearer metal would have it redeemed for the cheaper one because the purchasing power of the latter as currency is greater than its market value as bullion. This law was first discovered by Sir Thomas Gresham in the reign of Queen Elizabeth.

Greslon (grā-lōn'), **Adrien,** 1618–97; French missionary; b. Périgueux; was in America, 1647–50, and in China, 1657–70. While in Chinese Tartary he is said to have met an Indian woman whom he had known on Lake Huron, and who had been sold from tribe to tribe. This led to the belief that America and Asia approached each other very nearly.

Gresset (grā-sā'), **Jean Baptiste Louis,** 1709–77; French author; b. Amiens. While a Jesuit novice he ridiculed some of the features of convent life in a poem, "Vert-Vert," which has often been translated into English; won fame in Paris by subsequent compositions (including "La Chartreuse," "Le Lutrin Vivant," and "Les Ombres"), which gave umbrage to his superiors, and he left the order. After retiring to Amiens and marrying, he condemned his former want of piety, and burned several unpublished pieces. His most successful play was the comedy "Le Méchant." He became a director of the Academy.

Gret'na Green, village in Dumfries, Scotland, 8 m. NW. of Carlisle; long famous for marriages contracted there by runaway couples from England, the Scotch law simply demanding that a mutual declaration of marriage should be exchanged in presence of a witness. In 1856 such marriages were rendered invalid unless one of the parties had been residing in Scotland for three weeks previously.

Greuze (gröz), **Jean Baptiste,** 1725–1805; French genre painter; b. Tournus, near Macon; studied under Grandin and followed him to Paris; was admitted to the Academy of France, 1769; produced many works, including "The Blind Man Cheated" and "The Unnatural Father." His pictures are found in all the galleries of Europe, and there is at least one in the Metropolitan Museum, New York.

Grev'ille, Charles Cavendish Fulke, 1794–1865; English author; in 1821 became Clerk of the Council in Ordinary, a position he held for nearly forty years. His fame rests on his "Journals of the Reigns of George IV and William IV," which ran through many editions, both in Great Britain and the U. S.

Gréville (grā-vēl'), **Henry,** pseudonym of MADAME ALICE MARY CÉLESTE DURAND, b. Fleury, 1842–1902; French author; b. Paris; removed early to St. Petersburg, where her father became a professor in French; married M. Durand, a professor in the law school, and returned, 1872, to Paris; published many

works, some of which relate to Russian life, including "Dosia," which received from the Academy the Montyon prize, 1876; "The Koumiassines," "Sonia," "Rose Rozier," "Count Xavier," "The Daughter of Dosia," "Cleopatra," "A Mystery."

Grévy (grā-vē'), **François Paul Jones,** 1870–91; French statesman; b. Mont-sous-Vaudrey, in the Jura; was elected to the National Assembly, 1848, and, without acting with the ultra-Radicals, still sat on the benches of the Montagne. Under the empire he was elected to the Corps Législatif by the department of Jura. He acted there as a Moderate Republican, which character he maintained after the Revolution of 1870, when he was elected to the National Assembly. Having acted twice as president of the Chamber of Deputies he was elected President of France, January 30, 1879. His administration was exceedingly popular, and Grévy was reëlected, December 28, 1885, but he surrendered himself to the influence of his son-in-law, M. Wilson, who soon involved Grévy in a scandal. The latter, trying to shield his son-in-law, clung to his presidential office until he was forced to resign, December 2, 1887.

Grey, Charles (Second Earl), 1764–1845; British statesman; b. Fallowden, Northumberland; entered Parliament as a Whig, 1789; was one of the managers of the Hastings trial; was an early friend of Parliamentary reform; opposed the Irish union, 1799; became (as Lord Howick) First Lord of the Admiralty, 1806, and succeeded Fox as Secretary of Foreign Affairs; carried the bill for abolishing the slave trade, 1806; and being defeated in the measure for abolishing the oath which kept Roman Catholics from the holding of commissions in the army and navy, dissolved the cabinet; took the title of Earl Grey, 1807; long led the Reform Party in Opposition; was again Premier, 1830–32 and 1832–34. The great event of his last administration was the passage of the Reform Bill of 1832.

Grey, Sir George, 1812–98; British colonial governor; b. Lisburn, Ireland; Governor of S. Australia, 1841–45; knighted, 1848; Governor of New Zealand, 1845–54, of the Cape of Good Hope, 1854–61, and again of New Zealand, 1861–67; became Superintendent of the Province of W. Auckland, 1875, and Premier of New Zealand, 1877; published "Journals of Discovery in Australia," "Polynesian Mythology and Traditions of New Zealand," etc.

Grey, Lady Jane, 1537–54; English noble lady; b. Bradgate, Leicestershire; daughter of Henry Grey, Duke of Suffolk, and great-granddaughter of Henry VII in the female line; was regarded as a prodigy of learning; married Lord Guildford Dudley, son of the Duke of Northumberland, 1553. Edward VI, persuaded by Lady Jane's father and father-in-law, had set aside the claims of his sisters and declared Lady Jane his successor. She reluctantly assented, and was proclaimed queen, July 10, 1553. Ten days later Queen Mary was proclaimed, Lady Jane and her husband were tried for treason, and, February 12, 1554, were beheaded.

Grey'hound, variety, or group of varieties, of the domestic dog, distinguished chiefly by slender, graceful build, quick sight, and great speed in the chase. In other points there is much lack of uniformity. A good hound has a fine, soft, flexible skin, with thin silky hair, great length of nose contracting gradually from the eye to the nostril, a full clear penetrating eye, small ears, erect head, long neck, chest capacious and deep, but not wide, shoulders deep and placed obliquely, ribs well arched, contracted belly and flank, great depth from

English Greyhound.

the hips to the hocks of the hind legs, forelegs straight, and shorter than the hind. The name has no reference to color, but is derived from the Icelandic *grey*, a dog. Scotland, Ireland, and Russia have stocks of the greyhound which are keen of scent, but most greyhounds are deficient in this respect, and follow the game by sight alone. Some strains are of very large size and treacherous disposition, while the little Italian greyhound is a gentle household pet. The celebrated dog Gellert, a greyhound whose myth is found in the folklore of several nations, was a most faithful servant, but with few exceptions his modern representatives are unintelligent, and do not attach themselves strongly to any master. The race has been much modified by crossing with other breeds.

Grieg (grēg), **Edward,** 1843–1907; Norwegian composer and pianist; b. Bergen; studied in Leipzig; afterwards went to Christiana, where he became intimate with Björnson and Ibsen. He published many works in various forms for piano solo, piano with orchestra, chamber music, large orchestral suites, such as "Peer Gynt," and other works, all imbued with a keen originality and enjoying a wide popularity. His music is characterized by the strongest national peculiarities, alternating brilliance, and extreme gloom.

Griesbach (grēs'bäkh), **Johann Jakob,** 1745–1812; German theologian; b. Butzbach; Prof. Extraordinary in Theology at Halle, 1773–75; Prof. Ordinary at Jena, 1775–1812; published the first critical edition of the Greek New Testament ever made, which has been reprinted in many editions.

Grif'fin, Charles, 1826–67; U. S. military officer; b. Licking Co., Ohio; graduated at West Point, 1847; served in the war with Mexico, 1847–48; appointed captain, 1861; promoted

to brigadier general of volunteers, 1862; commanded a brigade in the Virginia Peninsular Campaign. In the Rappahannock Campaign he commanded a division at the battle of Fredericksburg, 1862, at Chancellorsville, 1864, Gettysburg, 1863, Wilderness, 1863, and at Spottsylvania, assault and siege of Petersburg, and the various battles of the final campaign, 1864–65; promoted to major general of volunteers, 1865; subsequently was colonel of the Thirty-fifth U. S. Infantry, and commanded military districts in Texas and Louisiana.

Griffin, Gerald, 1803–40; Irish novelist; b. Limerick; works include "The Colleen Bawn," "The Invasion," "The Rivals," and "The Duke of Monmouth"; was distinguished as a poet. His tragedy "Gisippus" was successfully performed in Drury Lane after his death.

Griffin, fabulous monster, half bird, half beast. On the monuments of Chaldea and Assyria it appears as a lion with wings, hind legs and tail like the eagle; on those of Egypt it is a hieroglyph signifying swiftness; in Mycenæ, it represented a wild and swift bird of prey, and is depicted running at full speed. The griffin of early Greek art came, in the main, from the Hittites; in the later period of Greece, it exhibited the body of a lion, an eagle's head, with long sharp ears, a quill mane, and large beautiful wings. The griffin was a dragon foe of the gods and preyed on other animals. The belief in griffins continued throughout the Middle Ages, and consequently appears in heraldic coats of arms.

GRIFFIN.

Grif'fon Vul'ture, name applied to the large vulture (*Gyps fulvus*) of Europe and Asia. See VULTURE.

Grijalva (grē-häl'vä), **Juan de,** abt. 1489–1527; Spanish soldier, discoverer of Mexico; b. Cuéllar; joined his uncle, Diego Velasquez, in Cuba, 1511; commanded an expedition, 1518; entered the river which bears his name in Tabasco, and then followed the coast to Cape Rojo, or perhaps to Tampico; was dismissed from the service for not having formed settlements; went to Santo Domingo, thence to Jamaica, later to N. Mexico, and finally to Nicaragua, where he died.

Grijalva, called also TABASCO, and in its upper course CHIAPA and MESCALAPA, river of Guatemala and Mexico, rising in the mountains of Huehuetenango, and emptying into the Gulf of Mexico; length, 265 m. Frontera, just above the mouth, is the principal port of Tabasco, and small steamers run up to San Juan Bautista, 50 m.

Grillparzer (grīl'pär-tsėr), **Franz,** 1791–1872; Austrian dramatist; b. Vienna; was in the civil service, 1813–56, and for some years director of the imperial archives; first attracted notice by his "fate tragedy," "The Ancestress," performed, 1816. His subsequent dramas "Sappho," "The Golden Fleece," "The Waves of Love and of the Sea" (The Story of Hero and Leander); "King Ottokar's Fortune and Death"; and the witty comedy "Woe to Him Who Lies," proved him to be one of the greatest German dramatists of the period following the classical era.

Grilse (grīls). See SALMON.

Grimaldi (grē-mäl'dē), one of the four great patrician families of Genoa. They derive their descent from Grimoald, mayor of the palace under the Frankish king Childebert II. In 980 they gained possession of the lordship of Monaco, of which they remained the hereditary princes for upward of seven centuries. They belonged to the Guelph faction, and coöperated with the Fieschi in the struggles against the Ghibellines, headed by the Doria and Spinola families. RANIERI II, as an ally of Philip the Fair of France, 1304, defeated the Flemish fleet under Guy of Flanders. CARLO II, surnamed "the Great," commanded the Genoese crossbowmen and was killed in the battle of Crécy (1346). Antonio, an admiral, 1332, avenged the aggressions of the Catalonians and Aragonese by ravaging their coasts, but was disastrously defeated, 1353, off the coast of Sardinia. GIOVANNI, in the service of the Milanese, gained a decided victory over the Venetian fleet on the Po, 1431. DOMENICO distinguished himself as a zealous churchman, and as a naval commander at the battle of Lepanto (1571), and became a cardinal. GERONIMO, who died, 1685, at the age of eighty-nine, was Bishop of Aix. He was sent as nuncio to Germany by Urban VIII, and made a cardinal.

Grimaldi, Joseph, 1779–1837; English pantomimist and actor; b. London; while still very young had become one of the most successful pantomimists in London. As clown in the pantomime of "Mother Goose" he won his chief renown, and the piece was continually repeated.

Grimké (grīm'kē), **Angelina Emily,** 1805–79; American reformer; b. Charleston, S. C.; sister of Frederick Grimké (1791–1863), Judge of the Ohio Supreme Court, 1836–41; removed to Philadelphia, 1828, and joined the Society of Friends; in 1830, published "An Appeal to the Christian Women of the South," advocating antislavery measures; in 1836, emancipated the slaves she had inherited from her father, and, in company with her sister Sarah, addressed large audiences of women in N. cities on the subject of slavery. Married Theodore D. Weld 1838.

Grimké, Sarah Moore, 1792–1873; American reformer; b. Charleston, S. C.; in 1821 made Philadelphia her place of residence, and published, 1827, "An Epistle to the Clergy of the Southern States"; considered one of the most efficient antislavery documents of the day; while lecturing in New England wrote "Letters on the Condition of Women and the Equality of Sexes"; afterwards made her home with the Weld family, and assisted as a teacher in their school, established in Belleville, N. J., 1840.

Grimm, Friedrich Melchior (Baron), 1723–1807; German literary critic; b. Ratisbon, Bavaria; having failed sadly with his tragedy "Banise," went to Paris as tutor in a noble family; became the regular correspondent of Catharine II, of Russia, Gustavus III, of Sweden, Stanislaus, of Poland, and other sovereigns, and his letters give a minute chronicle of French literature, 1753–90. In 1776 he was made a baron and ambassador from the Duke of Saxe-Gotha to the French court, but, 1792, had to leave France with the rest of the foreign diplomats; retired to Germany, where Catherine II gave him a pension and some shadow of a diplomatic position.

Grimm, Jakob Ludwig Karl, 1785–1863; German philologist and archæologist; b. Hanau; became, 1816, librarian at Cassel; Prof. at Göttingen, 1830; at the Univ. of Berlin, 1841; published "German Mythology," "German Grammar," "History of the German Language," "On the Origin of Language," etc., and with his brother Wilhelm "Nursery and Fireside Stories," one of the most popular collections of fairy tales," and a "German Dictionary."

Grimm, Wilhelm Karl, 1786–1859; German philologist and archæologist; b. Hanau; brother of the preceding, whom he followed as librarian at Cassel, Göttingen, and Berlin; works include "Translations of Ancient Danish Heroic Poems of the Sixth Century," "German Runic Characters," "The Song of Roland," "Heroic Legends of Germany."

Grimm's Law, named from its discoverer Jakob Grimm, states the principle of the interchange of the mute consonants in Aryan languages in words derived from the same roots. For example, *p*, *b*, and *f* in Latin, Greek, and Sanskrit are in Gothic, English, Dutch, etc., respectively represented by *f*, *p*, and *b*, and in old High German by *b* (v), *f*, and *p*. The following table shows the principal changes:

	Labials	*Dentals*	*Gutturals*
Greek (Latin, Sanskrit)	p, b, f,	t, d, th,	k, g, ch,
English (Anglo-Saxon), Gothic, etc.	f, p, b,	th, t, d,	h, k, g,
Old High German	b(v), f, p,	d, g, t,	g, ch, k.

As examples: Eng. *father* = L. *pater*, Gr. *patēr*, Sanskrit *piti*; Eng. *brother* = L. *frater*, Gr. *phrater*, Sanskrit, *bhratar;* Eng. *kin* = L. *genus*, Gr. *genos*; Eng. *head* = Anglo-Sax. *hlafod*, L. *caput*, Gr. *keph* (*ale*), etc.

Grin'dal, Edmund, 1519–83; English prelate; became chaplain to the king, 1551; on the accession of Mary fled to Strassburg; returning after her death, was employed to draw up a new liturgy; 1559, was made master of Pembroke Hall, Cambridge, and Bishop of London; 1570, Archbishop of York; and, 1575, of Canterbury. Incurring the displeasure of Elizabeth, his see was sequestered from him; was afterwards partially restored, but, 1582, became blind, and resigned.

Grindelwald (grīn'dĕl-vält), village in canton of Bern, Switzerland; 35 m. SE. of Bern; in a valley just NW. of the great mountains Eiger, Mettenberg, and the Wetterhorn, between which descend the upper and lower glaciers of Grindelwald. The manufacture of kirchwasser and the herding of cattle are the chief industries of Grindelwald, which is much visited in summer by tourists.

Grind'ing and Crush'ing Machin'ery; mechanical devices for disintegrating hard or fibrous substances. Crushing machinery usually acts by pressure. Grinding machinery acts by compression and lateral action. In breaking up hard materials existing in masses the first operation is usually that of blasting. Very large pieces are blasted again, and when sufficiently reduced are broken up with blows of hammers

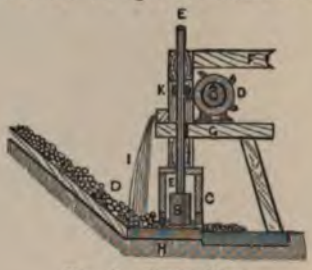


Fig. 1. Stamp Mill.

or by crushing machinery. The *stamp mill*, shown in Fig. 1, is one of the oldest and most generally known forms of crushing apparatus. Usually a row (battery) of such stamps, placed side by side, operated by a single shaft, is used. A modified steam hammer is sometimes used, and is very effective in breaking up medium-sized masses. *Cornish crushers* are rolls similar to those used in ironworks, and are sometimes used for crushing ores and

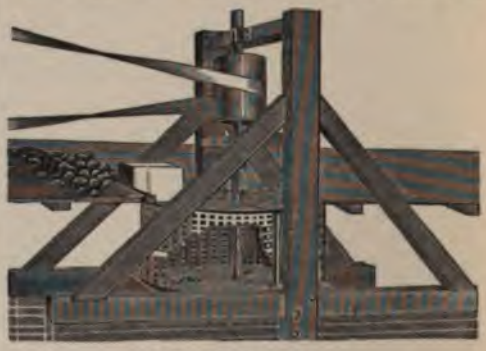


Fig. 2. Crusher.

stones. For reducing to small pieces masses already broken to moderate size, *stone breakers* are used. The working part of the Blake stone crusher is a pair of jaws, one fixed and one moving, pivoted at the lower end. The moving jaw swings through a small arc with each revolution of a fly-wheel shaft, and breaks against the fixed jaws the material placed in the upper part of the space between them, the fragments falling till caught in the narrower part, where the next impact of the swinging jaw breaks them still finer. This process con-

tinues until the fragments are small enough to fall through an opening below. Various other machines act on the same principle.

Fig. 2 represents an example of that class of machinery in which crushing is produced by percussive action. It consists of a cylinder or tub-shaped vessel, made in sections of heavy iron plates and perforated with holes. The material to be crushed is fed from a hopper into the cylinder, where it is caught by whirling hammers, broken up by collision with them and mutual impact, and then thrown out

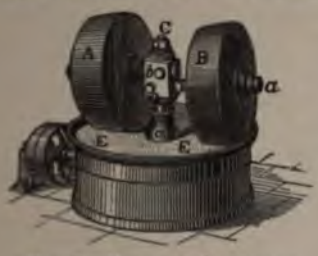


Fig. 3. Vertical Seed-mill.

through the perforations into the surrounding chamber. For crushing sugar cane and similar substances where liquid is to be expelled from a cellular or porous mass, a set of three cast-iron rolls is used, one being placed above and between the two others.

Fig. 3 represents an edge runner, a form of mill which is used principally for crushing organic materials, for expressing oil from seeds, and for similar work. It is also used in grinding chocolate, in mixing mortar, and in kneading clay for brick or porcelain manufacture. The machine shown in Fig. 4 is intended for the reduction to fine powder of such materials as sand, gravel, or crushed ore. The material entering the cylinder encounters the swiftly revolving "paddles," and, becoming entangled in the accompanying air currents, the particles are, by mutual attrition and collision, ground into impalpable powder. For grinding

Fig. 4. Pulverizer.

coffee, spices, dry paints, soft ores, solid chemicals, and easily crushed substances in general, mills with grinding surfaces of cast iron are commonly used. In these mills the rubbing faces of the metal are usually corrugated or ribbed in a manner and to a degree which is determined by the nature of the work to be done.

In grain mills the grinding surfaces are faces of two stones. Many forms of such mills are in use. In some cases mills are constructed having the stones set with their axes horizontal, the special advantages being the convenience with which pressure may be adjusted and the more rapid feed and delivery secured, which permits higher speed and reduces liability of choking. In a large type of corn mill the upper stone is built up, its lower half being of pieces of stone cemented firmly together. In the other forms of mill the stones are usually smaller, and often made in a single piece. The fixed stone has usually a perfectly flat grinding surface; the moving stone is hollowed toward the center to allow the material ground to flow freely between the grinding surfaces, and in order that a more thorough comminution may be secured during its passage toward the circumference. The faces of both stones are cut, with straight grooves, of wedge-formed section, and in directions inclined to the radii.

Grind'stone, thick circular disk of stone, usually sandstone, used for bringing dull cutting instruments of steel to an edge, the blade being applied to the edge of the stone, which revolves around a central axis. The best grindstones used in the U. S. are obtained in Berea, Ohio, and on Grindstone Island, Nova Scotia. Various forms and materials are also used in making grindstones for cutting glass, gems, etc.

Gringore (grăṅ-gōr'), or **Gringoire** (grăṅ-gwär'), **Pierre,** abt. 1475–1547; French poet; b. Caen; went to Paris abt. 1502, and joined the *Enfants sans souci*, a literary and dramatic brotherhood, in which he was promoted to the highest dignity, and for it wrote farces, sotties, and satires which had a short-lived popularity, including "The Prince of Fools and the Foolish Mother," "The Obstinate Man," and "The New World." Many of his moralities and satires attacked the church and society in general. Late in life he became a champion of orthodoxy.

Grinnell' Land, tract of land in the Arctic Ocean; first seen, 1850, and mapped (1854) by Dr. Hayes, of Kane's expedition; named after Henry Grinnell, who fitted out the Arctic expeditions of 1850 and 1854. It is found to extend slightly N. of 83° N. lat., and has on the N. that part of the Arctic Ocean called Lincoln Sea, which when visited was covered with palæocrystic ice.

Grippe. See Influenza.

Griqualand (grē'kwä-länd), two interior districts of S. Africa, denominated East and West respectively. Griqualand East lies between lats. 30° and 32° S. and lons. 28° and 30° E., with Basutoland and Natal on the N. and Kaffraria and Pondoland on the S.; area, 7,594 sq. m.; pop., 222,690; is a dependency of Cape Colony. Griqualand West is incorporated into Cape Colony; lies between lats. 27° and 29° S. and lons. 22° and 25° E., N. of the Orange River and W. of Orange River Colony; area, 15,197 sq. m.

Griquas (grē'kwäs), called Bastaards by the Boers, mixed race in S. Africa, the offspring of Hottentot and Bushwomen by the Boers, or colonists of Dutch descent. Many of them are well-to-do breeders of cattle, and have

adopted the habits and religion of Europeans. They inhabit the districts known as Griqualand East and Griqualand West.

Grisebach (grē'zė-bäkh), **August Heinrich Rudolph,** 1814–79; German botanist; b. Hanover; was sent by the Hanoverian Govt., 1839, to study the flora of Turkey; traveled through Thrace, Macedonia, Albania, and Bithynia, and, 1841, was appointed Prof. of Botany at Göttingen and director of the botanical garden; published "Flora of British West India Islands," "Outlines of Systematic Botany," and other works.

Grisi (grē'zē), **Giulia,** 1812–69; Italian opera singer; b. Milan; daughter of a French topographical officer; at the age of sixteen made her first public appearance at Bologna, in Rossini's "Zelmira"; subsequently achieved triumphs at Florence, Pisa, and Milan. For her the opera "Puritani" was written. She married Signor Mario, the tenor. In 1854 they visited the U. S. together, and sang in the principal cities. In later years her residence was in England.

Gris'wold, Matthew, 1714–99; American legislator; b. Lyme, Conn.; held the office of Lieutenant Governor of Connecticut for several years; governor, 1784–85; also judge of the Supreme Court; president of the convention which ratified the Federal Constitution, 1788.

Gritti (grēt'tē), **Andrea,** 1454–1538; doge of Venice; as commander in chief regained Brescia and Bergamo from the French, 1512, but was shortly after defeated and made prisoner by Gaston de Foix, and while in Paris formed an alliance with France. On his return to Venice he coöperated with French troops in driving the imperialists out of Brescia and overrunning the Kingdom of Naples; 1523, was elected doge.

Griz'zly Bear. See BEAR.

Grocyn (grō'sĭn), **William,** 1442–1519; English philologist; b. Bristol; became prebendary of Lincoln, 1486. After a considerable time spent in Rome in the study of Greek under eminent teachers, he returned, 1491, to Oxford, where he was appointed the first Prof. of Greek.

Grolier de Servier (grō-lĭ-ā' dė sĕr-vĭ-ā'), **Jean** (Vicomte d'Aguisy), 1479–1565; French art collector and bibliophile; b. Lyons; represented France as ambassador at Rome, where he made a remarkable collection of the best works of all kinds published at that time. Many volumes were printed expressly for him and bound in most luxurious styles. He also made a valuable collection of medals. In 1675 the volumes were sold and scattered, but the collection of medals was kept intact and purchased by Louis XIV. Grolier's volumes are much sought after by book collectors, and command very high prices.

Grono'vius, Jakob, 1645–1716; Dutch scholar and editor; b. Deventer; son of Johann Friedrich; traveled extensively to examine the great libraries in England, Spain, Italy, etc., and settled at Pisa as Prof. of Belles Lettres; in 1679, became a professor at Leyden; edited Greek and Latin writers such as Stephanus Byzantius and Herodotus, and the monumental "Thesaurus Antiquitatum Græcarum."

Gronovius, Johann Friedrich, 1611–71; Dutch scholar and critic; b. Hamburg; Prof. of History and Eloquence at Deventer, 1642; of Greek and History at Leyden, 1659; prolific editor of Latin classics, and author of many archæological treatises.

Gros (grō), **Antoine Jean** (Baron), 1771–1835; French historical and portrait painter; b. Paris; pupil of David; Legion of Honor, 1828; created baron, 1824; member of the Institute, 1816; painted several large pictures depicting the campaigns of Napoleon; ceilings in the Louvre and the dome of St. Geneviève, and numerous portraits.

Grosbeak (grōs'bēk), popular name of several birds, principally belonging to the family *Fringillidæ*. The U. S. have the evening grosbeak, the pine grosbeak, the rose-breasted grosbeak, the blue grosbeak, and others. The cardinal grosbeak is the Virginia redbird, a fine songster, often seen in cages. The social grosbeak of S. Africa is one of the weaver birds which builds a huge roof in some large tree, beneath which sometimes as many as 300 pairs of birds are lodged.

EVENING GROSBEAK.
1. Male. 2. Female.

Grose (grōs), **Francis,** 1731–91; English antiquary; works include "Views of Antiquities in England and Wales," "Classical Dictionary of the Vulgar Tongue," "Provincial Glossary," "Treatise on Ancient Armor and Weapons," "Military Antiquities," and "Rules for Drawing Caricatures."

Groseilliers (grō-zā-yā'), **Médard Chouart de,** French explorer of the seventeenth century; was an early emigrant to Canada; abt. 1660, penetrated W. to the territory of the Sioux; subsequently went to England; and, 1663, led to Hudson Bay an English vessel commanded by Gillam; returning to the French service, aided to break up the English posts in the bay, which he explored.

Grosseteste (grōs'tēst), **Robert** (probably named GROSSETESTE, "great head," from his learning and ability), abt. 1175–1253; English prelate; b. Stradbrook, Suffolk; was made Archdeacon of Wilts, 1214; received other preferments, and, 1214, received the doctorate of theology and became *rector scholarum* at Oxford; became Bishop of Lincoln, 1235; reformed his large diocese with vigor; opposed successfully alike the intrusions of king, nobles, and the pope in local ecclesiastical affairs; was involved in a controversy with Innocent IV, who strove to fill the richest places in all the Church with Italians and Provençals; was one of the most learned and popular preachers of his day, a voluminous author, and a successful instructor, Roger Bacon being among his pupils.

Grossi (grōs'ē), **Tommaso,** 1791–1853; Italian poet and novelist; b. Belluna, on Lake Como; passed his whole life as a notary in Milan; works include "The Fugitive" and "The Swallow," short poems; "Ildegonda," a romance in verse; "The Lombards in the First Crusade," a poem; "Marco Visconti," an historical novel.

Gros Ventres (grō väṅ'tr), "big bellies," members of two wholly distinct tribes of N. American Indians, belonging to the Siouan stock: (1) the Gros Ventres of the Missouri, or Minnetarees; (2) the Gros Ventres of the Prairies; each tribe is mentioned under this designation in the Lewis and Clark narrative (1806). Treaties were made with them at Fort Laramie, 1851; at the Judith, 1853 and 1855; and at Fort Benton, 1865; after which they remained peaceful toward the whites, though warring with neighboring tribes. There are now about 1,000 in all, settled at agencies in Montana and N. Dakota.

Grote, George, 1794–1871; English historian; b. Clayhill, Kent, of German ancestry; became a Liberal political writer; sat in Parliament for London, 1832–41; was distinguished by efforts in favor of the use of the ballot in elections; in 1860, became vice chancellor of London Univ., and, 1869, president of University College. His principal works are his famous "History of Greece," "Plato and the Other Companions of Socrates," "Aristotle," "Minor Works," containing essays and reviews; was buried in Westminster Abbey.

Grotefend (grō'tē-fĕnt), **Georg Friedrich,** 1775–1853; German philologist and archæologist; b. Münden, Hanover; was director of the Lyceum at Hanover, 1821–49. Much of his professional work was in the field of Latin philology; but his chief claim to fame rests on his discovery of the key for deciphering the ancient Persian inscriptions of Persepolis. Among his publications are "New Contributions Toward the Explanation of the Persian Cuneiform Writings" and "New Contributions Toward the Explanation of the Babylonian Cuneiform Writings."

Grotius (grō'shĭ ŭs), or **de Groot, Hugo,** 1583–1645; Dutch jurist and scholar; b. Delft; was admitted to the bar at The Hague, 1599; soon gained distinction by editions of the classics and by original compositions; became historiographer of Holland, 1601; advocate general of the fisc for Holland and Zealand, 1607; pensionary (paid counselor) of Rotterdam, 1610. This last position gave him a seat in the States of Holland, and afterwards in the States-General. He published, 1608, his "De mari libero," in defense of the freedom of the seas against the pretensions of Portugal and England; 1610, his treatise on the antiquity of the Batavian Republic; 1612, finished his annals and history of Belgian affairs; in 1618, was involved in the defeat of the Liberal, or Armenian, party, of which his friend, John of Barneveldt, was the leader, and was imprisoned, but escaped to Antwerp and thence to Paris. While in prison he wrote a treatise on the truth of christianity, commentaries on the New Testament, etc.; in Paris, 1623, his treatise, "De jure belli et pacis," to which modern international law owes its first development. Becoming a resident of Hamburg, 1632, he entered the service of the Queen of Sweden, and was made a privy councilor and ambassador to France; died at Rostock, Germany.

Grotta del Cane (grōt'tä dĕl kä'nē), "cave of the dog," small cave in S. Italy, between Naples and Pozzuoli, remarkable for its exhalations of carbonic acid gas, in which a candle is instantaneously extinguished and small animals stifled. It received its name from the circumstance that small dogs are generally used to show the experiment.

Grouchy (grō-shē'), **Emmanuel** (Marquis de), 1766–1847; French military officer; b. Paris; as brigadier general fought in La Vendée, 1794; served with distinction in Italy and on the Rhine, 1799–1800; defeated the Prussian cavalry at Zehdenik, 1806; was in the campaigns in Prussia, Spain, Austria, and Russia; on the retreat from Moscow led the emperor's bodyguard; on the restoration of the Bourbons, 1814, was banished, but allowed to return, 1815; served under Napoleon in N. France, and was made a marshal; after the defeat of the Prussians at Ligny, 1815, was ordered to pursue Blücher, and so was unable to coöperate at Waterloo; after that battle led the scattered remnants of the army back to France, and soon resigned; was again banished by the Bourbons, and resided for five years in the U. S.; after the Revolution of 1830 was created a peer of France.

Ground Bass, musical form belonging to an early period of modern music; consists in a short theme or subject placed in the bass and constantly reiterated throughout the piece; over this play varied figures and contrapuntal conceits. Both Bach and Händel made occasional use of this device. In modern times Brahms may be mentioned as giving a fine example in his "Variations on a Theme of Haydn" for full orchestra.

Ground Doves, popular name for those species of pigeon which seldom fly, but walk or run, often quite rapidly, on the ground. The ground dove of the S. U. S. is less than 7 in. long. The genus comprises the smallest pig-

cons known. The name is also applied to a kind of thrush—the spotted ground thrush or ground dove—found throughout the greater part of Australia and Van Diemen's Land, and prized on account of the delicacy of its flesh.

Ground Hog. See WOODCHUCK.

Ground I'vy, strong-smelling, trailing plant (*Nepeta glechoma*) belonging to the *Labiatæ*; a native of Europe, but naturalized in the U. S. At one time it was used in medicine, chiefly as a domestic remedy for colds, coughs, etc.

Ground Nut, or **Pea'nut.** See GOOBER.

Ground Pines. See CLUB MOSSES.

Ground Squir'rels, any one of various rodents intermediate in character between the true squirrels and the marmots.

Group'er, name popularly applied in the S. Atlantic and Gulf states to marine fishes of the genus *Epinephelus* or *Mycteroperca*. The species of the genus are numerous; they attain a large size, and are important food fishes.

Grouse, name given to the game birds of the subfamily *Tetraoninæ*, a group of large gallinaceous birds inhabiting the N. hemisphere, and most numerous in N. America. They have the head completely feathered except a bare strip above the eye, the tarsus partly or com-

PINNATED GROUSE.
Female (upper figure) and Male.

pletely feathered, the feathers sometimes, as in the ptarmigan, extending to the toes. The tail consists of sixteen to twenty feathers, and the sides of the neck are frequently adorned with tufts of feathers. The most common and best-known European species are the black grouse and the red grouse. The red grouse is confined to the British islands, and is the popular game bird.

Grove, Sir George, 1820–1900; English engineer and author; b. Clapham; erected in Jamaica, W. I., the first two cast-iron lighthouses built; under Robert Stephenson, was employed on the Chester general station, and on the Britannia tubular bridge; was secretary to the Society of Arts, 1849–52, and to the Crystal Palace Company, 1852–73; became director of the Royal College of Music, Kensington, 1883, and was knighted; edited *Macmillan's Magazine* for some years; founded the Palestine Exploration Fund; edited and was part author of the great "Dictionary of Music and Musicians."

Grove, Sir William Robert, 1811–96; English physicist; b. Swansea, Wales; invented the powerful voltaic battery which bears his name; was Prof. of Experimental Philosophy in the London Institution, 1840–47. In his lecture, "The Progress of Physical Science since the Opening of the London Institution," 1842, he first advanced the doctrine of the mutual convertibility of the various natural forces, heat, light, electricity, etc., all of them being nothing but modes of motion. This doctrine is further developed in his essay, "On the Correlation of Physical Forces," 1846. He became president of the British Association, 1866; a justice of the Common Pleas, 1871; knight bachelor, 1872; and was judge of the High Court of Justice, 1875–87, when he was made member of the Privy Council.

Grow, Galusha Aaron, 1823–1907; American legislator; b. Ashford, Conn.; was admitted to the bar, 1847; member of Congress from Pennsylvania, 1851–53, 1855–57, and 1859–63; chairman of the Committee on Territories, 1859–61; speaker of the House of Representatives, 1861–63; delegate to Baltimore convention, 1864 and 1868; president of International & Great N. Railroad of Texas, 1875; congressman at large, 1894–1903.

Grubb, Sir Howard, 1844– ; Irish astronomical instrument maker; b. Dublin; was brought up in the optical instrument works of his father, Thomas Grubb, the celebrated maker of telescopes. On the death of his father became director of the establishment; member of the Royal Astronomical Society of London, of the Royal Society of Dublin, and of many other scientific bodies; builder of numerous important telescopes, including those at Oxford, and at the Potsdam Observatory; invented many improvements in astronomical instruments and instruments of precision; published numerous papers on applied optics.

Grubb, Thomas, 1801–78; Irish optician and instrument maker; b. Dublin; established large works there; was the most celebrated maker of telescopes in his day; constructed the great reflector at Melbourne, the 27-in. telescope of the Vienna Observatory, and numerous other instruments.

Gruber (grô'bèr), **Johann Gottfried,** 1774–1851; German cyclopedist; b. Naumburg, Prussian Saxony; was Prof. of Philosophy at Halle; wrote nearly thirty works on historical, critical, and imaginative subjects; was joint editor with Ersch of the "Allgemeine Encyklopädie der Wissenschaften und Künste," and sole editor for many years after Ersch's death.

Grub Street, London street, described by Johnson as "originally the name of a street near Moorfields, much inhabited by writers of small histories, dictionaries, and temporary poems, whence any mean production is called 'Grub Street.'" Marvel first used the name in its opprobrious meaning, as did Swift and Pope and other wits. Pope makes a severe assault in his "Dunciad" on the class who lived there, the most famous of whom are Goldsmith, Johnson, and Foxe the martyrologist. During the Commonwealth it was a species of Alsatia, and was a safe refuge for the pursued. For more than a hundred years it was the residence of index makers, copyists, translators, small writers, etc. The street is now known as Milton Street, the poet Milton having lived near it at one time.

Grundtvig (grōnt'vĭg), **Nicolai Frederik Severin,** 1783–1872; Danish author; b. Seeland; was a preacher of Copenhagen, and became the leader of a school opposed to centralization in church government. In 1848 he was elected to the Diet, took the lead against German influence and in favor of a Scandinavian union, and during the Schleswig-Holstein War wrote spirited songs. He published many historical works, including "Northern Mythology," a "Manual of Universal History," and hymns and patriotic ballads.

Grun'dy, Mrs., personage in Morton's play, "Speed the Plough" (1800); never appears on the scene, but constantly referred to in the phrase, "But what will Mrs. Grundy say?" The phrase now commonly stands for the judgment of society in general upon the conduct of individuals.

Gruner (grō'nĕr), **Wilhelm Heinrich Ludwig,** 1801–82; German engraver; b. Dresden; published at Rome, 1839, a series of engravings entitled "I mosaici della capella Chigii." For the Berlin Museum prepared a series after the cartoons of Raphael at Hampton Court; afterwards executed many frescoes for Prince Albert, and published in London works on fresco and other decorations and ornamental designs, and "Raphael Caryatides from the Vatican." In 1858 he became Prof. of Engraving at the Academy in Dresden.

Gruppe (grō'pē), **Otto Friedrich,** 1804–76; German philosopher, archæologist, and poet; b. Dantzic; 1830, became a contributor to the *Allgemeine Preussische Staatszeitung,* and his "Antæus" (1831), containing an open attack on the philosophy of Hegel, attracted some attention; 1844, was appointed Extraordinary Prof. of Philosophy at the Univ. of Berlin. The most noteworthy of his poetical works are his tragedies, "Otto von Wittelsbach" and "Demetrius," the latter a completion of a fragment by Schiller. His archæological writings include "Ariadne, die Tragische Kunst der Griechen."

Grütli (grüt'lē), or **Rüt'li,** small plateau on the W. shore of the Lake of Lucerne, in the canton of Uri, Switzerland; renowned as the place where Stauffacher, Fürst, Melchthal, and thirty other confederates met on the night of November 7, 1307, and started the insurrection against Austria which resulted in the independence of Switzerland.

Gruyère, or Gruyères (grü-yăr'), small town in the canton of Freiburg, Switzerland. The most famous cheese manufactured in Switzerland comes from the vicinity of Gruyère and bears its name. Pop. abt. 1,500.

Grysbok (grīs'bŏk), small reddish-gray antelope of the wooded mountains of S. Africa; is extremely active and timid.

Guachos (gwä'chōz). See GAUCHOS.

Guadalajara (gwä-dä-lä-hä'rä), capital and principal city of the state of Jalisco, Mexico; near the W. side of the Rio de Santiago; 408 m. NW. of Mexico City, and 5,052 ft. above the sea. Except Mexico City and Puebla, Guadalajara is the largest and finest city in the republic. The cathedral, founded 1561, is one of the most notable buildings in Mexico. The government palace, bishop's palace, and mint are all large and handsome structures. The city possesses a university and an academy of fine arts. It is the center of the Mexican cotton and woolen trade, and has several large mills, besides manufactories of a peculiar glazed pottery, saddlery, confectionery, etc. Guadalajara was founded, 1542, and was early an important place. Pop. (1900) 101,208.

Guadalaviar (gwä-thä-lä-vē-är'), or **Tu'ria,** river of Spain; rises in the Sierra Albarracin, in SW. Aragon, near the sources of the Tagus, and after a SE. course of 130 m. through Valencia, falls into the Mediterranean.

Guadalquivir (gwä-däl-kē-vēr'), river of Spain; rises in the Sierra de Cazorla, province of Jaen, and after a SW. course of 316 m. through the provinces of Jaen, Cordova, and Seville, falls into the Atlantic 18 m. N. of Cadiz; navigable to Seville; affluents, on the right, the Guadalamar and the Jandula; on the left, the Guadajoz and the Xenil.

Guadalupe (gä-dä-lōp'), river of Texas; branch of the San Antonio; rises in Edwards Co., and after a course of 200 m. falls into the San Antonio 13 m. from its mouth, in Espiritu Santo Bay.

Guadalupe Hidalgo (gwä-dä-lō'pā ē-däl'gō), village of Mexico, in the Federal district; at the foot of the Guadalupe Mountain; 3 m. N. of Mexico City; is celebrated for a chapel built on the spot where, it is said, the Virgin Mary appeared to an Indian lad, 1736; the Virgin of Guadalupe having been proclaimed the especial patroness of the Indians, 1734. The shrine is yearly visited by thousands of pilgrims, and is very richly ornamented. Guadalupe Hidalgo gave its name to a treaty, signed there, February 2, 1848, between representatives of Mexico and the U. S., by which the war was brought to an end, and Texas, California, and the intervening territory were ceded to the U. S.

Guadalupe (gä-dä-lōp') **Moun'tains,** range of NW. Texas and of New Mexico; between the Rio Grande and the Pecos, forming a long spur of the Rocky Mountain system.

Guadeloupe, one of the Lesser Antilles, in the W. Indies; between Dominica and Antigua; area, 688 sq. m. Properly it is composed of two islands, separated by a narrow strait called Rivière Salée, or Salt River. The W. and larger part is known as Guadeloupe proper, or sometimes Basse Terre, from the capital town; it is entirely mountainous, the highest peak being an active or hardly quiescent volcano called the Soufrière, 4,858 ft. above the sea. The E. portion, or Grande Terre, is mainly a coral formation, and nowhere more than 350 ft. high. Guadeloupe belongs to France, and is ruled by a governor and elected council. United to it are the neighboring small islands of Marie Galante, Les Saintes, Désirade, and Petite Terre, with St. Barthélemy and the French part of St. Martin. Including the dependencies, the population (1906) was 190,273, less than a sixth whites, the rest negroes and mulattos. Sugar, coffee, and cacao are the principal products. Capital, Basse Terre, but Pointe à Pitre is the largest town. Guadeloupe was discovered by Columbus, 1493; settled by the French, 1633, who finally drove out the Caribs. The British have taken it four times, but it has remained a French possession since 1815.

Guadiana (gwä-dē-ä'nä), river of Spain; rises in the Sierra Alcaraz, in La Mancha; runs for a distance of 30 m. under ground; passes through La Mancha and Estremadura, enters the Portuguese province of Alemtejo, and falls into the Atlantic after a course of 316 m. It is navigable only for about 35 m. Its chief affluents are: on the right, the Giguela; on the left, the Javalon and the Ardila.

Guaiacum (gwā'yā-kūm). See LIGNUM-VITÆ.

Guaira (gwī'rä), **La,** port of Venezuela. See LA GUAIRA.

Guam (gwäm), largest island in the Marianas or Ladrone group in the Pacific Ocean; area, 200 sq. m.; pop. abt. 11,000; capital, Agana. The island was seized by the U. S. during the war with Spain, 1898, and was ceded by Spain in the treaty of peace; since then it has been quite thoroughly Americanized, and brought into close touch with the world at large by means of the cable connecting San Francisco with Manila, in the Philippines, which has a landing station here. It is directly in the line of travel between the U. S. and the Philippines, and has become an important coaling station. The products of the island are maize, copra, rice, and sugar, besides valuable timber.

Guanaco (gwä-nä'kō), kind of llama found from the highlands of Ecuador and Peru to the plains of Patagonia, and even on some of the adjacent islands; stands about 3 ft. high at the shoulder. This animal is of great importance to the Patagonian Indians, not only furnishing them with the major part of their food, but providing them with clothing as well.

Guanajuato (gwä-nä-hwä'tō), capital of the state of Guanajuato; in the valley of the Guanajuato River, 6,663 ft. above the sea; has many handsome buildings, including the government palace, mint, and Jesuit church. There is an ancient university, little frequented. The surrounding region presents a singular appearance, owing to the mining villages on the hills and the many establishments for treating gold and silver ore in the valleys. Pop. (1900) 41,486.

Guano (gwä'nō), properly, the accumulated excrement of birds. Humboldt found guano deposited in layers 50 to 60 ft. thick on the granite of many islands off the coast of Peru, and estimated that centuries must have passed over in order to form these beds. Abt. 1840, Peruvian guano was introduced into Great Britain, and, 1842, the Government began to export it. The value of guano as a fertilizer and the high price it commanded led to the search for and the discovery of similar deposits on the coast of Chili and Peru, in S. Africa, and elsewhere, and the price of the commodity fell. The Chincha Islands, the first source of supply of Peruvian guano, became exhausted 1874, and the Guañape Islands and others are now drawn on.

Guano of low grade is supplied by many islands of the Pacific, several of which are in the Auckland group. An act of the U. S. Congress, 1856, granted protection to citizens who should occupy and operate unclaimed deposits of guano, and, 1859, no less than forty-eight islands had been thus secured. "Bat guano," consisting of the dung of bats and birds, is formed in the caves of many warm countries. The so-called "fish guano" is the refuse of fishes caught for their oil. It has a high but unequal value as a fertilizer, and is prepared chiefly in Norway and on the Atlantic coast of the U. S.

Phosphatic guanos are found on certain W. India islands and in S. Carolina and Florida.

As to composition, guanos are ammoniacal or phosphatic. Ammoniacal compounds are most abundant in guanos found where the rainfall is light and the subsoil compact and clayey. An abundant rainfall leaches out these compounds, and the earthy parts alone remain. The phosphatic character of guano is due to the fact that the birds depositing it feed largely upon fish. The constituents of guano of fertilizing value are the ammonia and ammonia-forming compounds, phosphoric acid and potash. There are no definite rules as to what soil will be most benefited by guano. Peruvian guano should not be applied to crops in its pure state, but should be mixed with four times its weight of good soil, thus avoiding the danger of injury to the seed.

Guantanamo (gwän-tä'nä-mō), city of Cuba; province of Santiago de Cuba; on the Guaso River; 15 m. from Caimanerra, its port on Guantanamo Bay, one of the largest cities on the S. coast; exports sugar and lumber, and is in the chief coffee-growing district of Cuba. The U. S. Govt. has a naval station on Guantanamo Bay. On the surrender of Santiago, in the Spanish-American War, 1898, Gen. Ewers, of the U. S. army, demanded the surrender of Guantanamo, and received it, July 25th. Pop. of city (1900) 7,137.

Guar'anty, promise by a person that some other person (called the principal) shall pay a debt or discharge some duty or perform some act, and to answer for the consequences if the principal fails to do what is thus promised. Under the statute of frauds all contracts of guaranty must be in writing. Every indorser of negotiable paper is in fact a guarantor, but with peculiar rights and duties not known to common guarantors. Every surety is also a guarantor, but suretyship is a wider term. A guaranty is not in general negotiable. The party who is guarantied (called the guarantee) must preserve all the securities he has of the principal debtor unimpaired, because the guarantor is entitled to them if he has to pay the debt; and the guarantee must act with entire fairness toward the guarantor, and do all that can properly be done to lessen his burden. Thus an agreement between the guarantied creditor and the principal to reduce the debt shall be understood to inure to the benefit of the guarantor, and the guaranty shall be proportionately reduced.

A guaranty is not valid until it is accepted, whatever be the consideration and whether it be in writing or not; but acceptance may be implied from circumstances. Any material change in the extent, terms, or character of the principal's liability discharges the guarantor, even though the change be in no way injurious to him. He may assent to it, however, and will then be held. A guaranty in international law is a compact by which a power not a party to a treaty promises its aid in the event of certain specific promises made in the treaty being violated by one of the powers party to the treaty. Such a guaranty may refer to the promise to pay a sum of money or to cede territory, to one relating to the integrity of a state, the right of succession, religious franchises, etc.

Guaranys, or **Guaranis** (gwä-rä-nēz'), great race of S. American Indians who, at the time of the conquest, occupied most of the present territory of Paraguay, with portions of S. Brazil and NE. Argentina, and much of Uruguay. By language and customs they were closely allied to the Tupís of Brazil. The Guaranys lived in fixed villages; they had made some little progress in primitive arts, had no religion beyond a vague fear of demons and respect for their medicine men. Many of the first conquerors formed unions with the Guarany women, and Guarany, in a corrupt form, and with much intermixture of Spanish, became the common language of Paraguay, where it is still generally spoken. The population of Paraguay is mainly derived from the mixture of the Guarany and Spanish races. A few hordes, as the Ka-ás of the upper Paraná, remain in a wild state, and the Indians of the disputed territory of Missiones, between Argentina and Brazil, are still called Guaranys.

Guardi (gō-är'dē), **Francisco,** 1712-93; Venetian painter; a follower of Canaletto, whose drawings he sometimes painted, which accounts for his work being often taken for Canaletto's. He had great facility of invention, and his rapidity was remarkable. He often painted a picture in three days. Many of Guardi's works are in England, but four of the best are in Venice.

Guardafui (gwär-dä-fwē'), **Cape,** the easternmost point of Africa; in lat. 11° 50′ N., lon. 51° 21′ E.

Guar'dian, one who guards, or has the care and charge of another. Guardians of infants (minors) were, at common law: 1. Guardians by nature, by which is meant that guardianship which belonged to the ancestor, in respect to the heir apparent. It extended only to the care of the person. 2. Guardians by nurture. This guardianship also extended only to the person, and terminated when the ward was fourteen years of age. It was given to the father, and, if no father, to the mother. 3. Guardians in socage, limited to cases where the minor had lands by descent; and this guardianship extended over these lands and the person also, until the ward was fourteen years of age. It fell to the next of blood to whom the inheritance could not descend. 4. Guardians by statute; and 5, guardians by will, or testamentary guardians. These last two are almost the only ones known practically in the U. S., whereby a father has power to appoint by will a guardian for his minor children; and if such appointment be not made, or fails, the Court of Probate, or some other court exercising similar powers, makes the appointment.

Besides the general guardian, it is common for courts to appoint a guardian *ad litem* ("for the suit"), to represent the ward in the settlement of the guardian's accounts, or in or for any other legal proceedings. Guardians are also appointed generally in the U. S. for the insane and for spendthrifts, though in these latter cases they are usually termed committees of the person for the insane or committees of the property for spendthrifts and drunkards.

Guardianship is a personal trust, and the guardian cannot act for his own benefit by manipulating the property of his ward. This property must be kept in productive condition, and undue neglect in investing funds will subject the guardian to pay interest, even compound interest in the case of gross delinquency. Dealings between a guardian and ward are closely scrutinized by the courts, so that no unfair advantage shall be taken even after the guardianship has terminated. A guardian's compensation is usually fixed by law as a percentage upon moneys received and paid out.

Guarini (gwä-rē'nē), **Giambattista,** 1537-1612; Italian poet; b. Venice; became Prof. of Belles-lettres at Ferrara, 1557; was employed on diplomatic missions by Alfonso II, d'Este; subsequently hovered about the little courts of Italy; was often involved in lawsuits; was a friend of Tasso, though their relations became strained; was elected Prince of the Umoristi in Rome, 1611; wrote "Pastor Fido" (The Faithful Swain), published, 1590, a pastoral tragi-comedy in verse, and to the twentieth edition, 1602, adjoined a treatise on tragi-comedy poetry; also a prose comedy, a treatise on political liberty, and other works.

Guarino (gwä-rē'nō) **da Vero'na,** 1370–1460; Italian humanist; b. Verona; studied Greek under Chrysoloras in Constantinople; lived in Florence, 1405–14, teaching and lecturing; in Venice abt. 1415–18; in Verona, where he had extraordinary success, abt. 1421–29; in Ferrara after 1429, acting as interpreter at the council, and as tutor to the illegitimate son of Nicolo d'Este; also after 1436 was Prof. of Greek and Latin and of Rhetoric in the university; wrote school books and translated classical works; aided greatly in the revival of classical studies.

Guarnerius (gwär-nä'rī-ŭs), or **Guarneri** (gwär-nä'rē), family name of certain violin makers of Cremona in the seventeenth and eighteenth centuries. The most famous of the family was GIUSEPPE ANTONIO, 1683–1745, known as GUARNERI DEL GESÙ, whose best work ranks with the finest Amati and Stradivari instruments.

Guastalla (gwäs-täl'lä), town; province of Riggo nell' Emilia, Italy, which, together with several large villages—so near as to be almost suburbs—formed the little duchy of Guastalla. This duchy was given in dower by Napoleon I to his sister Paulina. Afterwards it was adjudged by the allied powers, 1815, to the ex-Empress Maria Theresa, and, 1860, it annexed itself to the new Kingdom of Italy. The town, which is situated on the Po, 19 m. NE. of Parma, is the see of a bishop and has a school of music. Pop. abt. 3,000.

Guatemala (gwä-tä-mä'lä), republic of Central America; bounded N. by Mexico, E. by British Honduras, and SE. by Honduras and San Salvador; area, 48,290 sq. m. It has a full coast line on the Pacific on the SW., but reaches the Caribbean Sea only at the head of the Gulf of Honduras. Surface generally mountainous, the main chain running parallel to the Pacific and about 45 m. distant; volcanic summits numerous, one of them, the Volcan de Agua, having an altitude of 13,100 ft.; disastrous eruptions occur, and earthquakes are not unknown; streams numerous, those on the W. side reaching the Pacific after a short course, those on the N. and NE. passing into Mexico and British Honduras; largest river, the Motagua (250 m.) on a branch of which is the capital; most important lake, Izabal or Golfo Dulce, connected with the sea by a broad, straitlike river, permitting free navigation for 50 m. inland; climate healthful except in the vicinity of the swamps along the Pacific coast, and temperate on elevations between 1,300 and 4,900 ft.; rainfall from 50 to 80 in., and greatest on the coast; weather often tempestuous during the summer rainy season.

Gold, silver, lead, tin, copper, manganese, antimony, sulphur, salt, lignite, marble, and lithographic stone are found, but are little worked; magnificent forests abound. Chief agricultural products, coffee, cocoa, maize, haricot beans, wheat, rice, tobacco, sugar, bananas; horses are small but excellent; cattle and sheep are raised to some extent; woolen and cotton goods, earthenware, bricks, cement, furniture, and cigars are manufactured; chief exports, mainly to Germany, the U. S., and the United Kingdom, coffee, rubber, sugar, timber, hides, and bananas; principal ports, San José, Ocos, and Champerico on the Pacific, and Puerto Barrios and Livingston on the Atlantic. There are about 500 m. of railroad. Roads are few, and communication over the country is generally by mule paths.

The republic is divided into twenty-two departments. The government is representative, and the power is vested in a National Assembly, the members of which are elected by universal suffrage for four years, a Council of State of thirteen members, partly elected by the National Assembly, and a president elected for six years. Nearly half the revenue is from duties, and most of the remainder from taxes on spirits, tobacco, etc. More than two thirds of the expenditure is for public debt, education, and war. Roman Catholicism is the prevailing religion, but all other creeds have complete liberty of worship. Education is free and compulsory. The higher educational institutions include schools for law, medicine, engineering, a national conservatory of music, a school of handicraft for women, a school of art, and a German school endowed by the German Govt. The population (1907) was 1,883,000; about sixty per cent Indians, remainder mostly half castes. Descendants of pure European blood are rare. The Indian population is quiet and inoffensive except when under political or religious excitement. Cock fighting and bull baiting are the common amusements. Capital of the republic Guatemala la Nueva; other large towns, Quezaltenango, Coban, Totonicapam, and San Pedro.

The native races, who appear to have reached a high degree of civilization, were conquered, 1524, by the Spaniards under Pedro de Alvarado, who established the audience and captain generalcy of Guatemala, embracing all of Central America to the Bay of Chiriqui and Chiapas. The country achieved its independence, 1821; soon after joined the Mexican Empire of Iturbide, but again became independent, 1823; was a part of the Central American Confederation, 1824–29; for many years was more or less dominated by Salvador; regained its autonomy, 1851; warred with Salvador, 1863, and its ally Honduras, and conquered them; again engaged in war with Salvador, 1906, forces of the latter country having invaded her territory, but after suffering defeat on Salvadorian soil, concluded an armistice, and through the offices of the U. S. and Mexico consented to a treaty of peace.

Guatemala la Antigua (—än-tē'gwä), or **Old Guatemala,** frequently called merely ANTIGUA; former capital of the republic of the same name, destroyed by an earthquake, 1773, was situated in a beautiful valley, 15 m. W. of the present capital. A still older Guatemala was washed away by the Volcan de Agua seventeen years after it was founded by Alvarado.

Guatemala la Nueva (—nō-ä'vä), or **New Guatemala,** capital of the republic of the same name; 106 m. WNW. of San Salvador. It has several large and attractive open squares or plazas. The principal building is the cathedral, erected 1780. There are twenty-four

other churches, a hospital, a university, a polytechnic college, a medical school, the government buildings, a mint, and other public buildings. The educational advantages are the best in Central America, and include, besides the university, a normal school, a polytechnic, a military college, and several schools for girls. An excellent museum was founded and is maintained by the Sociedád Económica. Cotton, yarn, muslins, artificial flowers, and articles of silver are manufactured. Its general air of brightness and prosperity has caused the city to be called the Paris of America. Pop. (1904) 96,500.

Guatemotzin (gwä-tä-mōt-zēn'), or **Guatemoc** (gwä'tä-mōk), also written GUATEMOZIN, QUAUHTEMOTZIN, QUAUHTEMOC, CUAUHTEMOC, etc., abt. 1497–1525; last Aztec sovereign of Mexico. He was a nephew of Montezuma II; was one of the leaders against the Spaniards, 1520; subsequently became high priest, and on the death of Cuitlahuatzin, 1520, was elected sovereign; defended Mexico against Cortés in the famous siege, 1521; on the fall of the city attempted to escape, but was captured. Cortés at first protected him, but later he permitted him to be tortured in an unavailing attempt to make him tell where treasure had been concealed. He and other captive chiefs were forced to accompany Cortés on his march to Honduras, 1524; on the way he was accused of inciting a revolt, and was hanged in Tabasco.

GUAVA.

Guava (gwä'vä), the fruit of the genus *Psidium*, certain small trees and shrubs of the myrtle family of the Asiatic and American tropics. They are cultivated in nearly all warm climates, where they yield important dessert fruits, that of *P. pyriferum* (white guava) being the best. From this is made the guava jelly.

Guaviare (gwä-vē-ä'rē), river of S. America, W. branch of the Orinoco; rising on the E. slope of the Andes, S. of Bogotá, Colombia, and flowing E. through a little-known region; length about 725 m.; is navigable through about two thirds of its course.

Guayaquil (gwī-ä-kēl'), principal port of entry and largest city of Ecuador; on the estuary of the Guayaquil, or Guayas; about 40 m. from the gulf. The river forms an excellent port, but very large vessels can only reach it at high tide; they generally anchor in the gulf. More than half of the total foreign commerce of Ecuador centers here, the principal exports being cacao, rubber, coffee, hides, and ivory nuts. Guayaquil was founded, 1535, on the site of an Indian town. It has suffered frequently from earthquakes, fires, pirates, and revolutions. Pop. (1907) abt. 80,000.

Guayaquil, Gulf of, inlet of the Pacific Ocean dividing the coast of Ecuador, at lat. 3° S.; is the largest gulf on the Pacific coast of S. America, and forms the best and most secure harbor. At its mouth it is 140 m. wide, narrowing gradually and divided within by the island of Puna.

Gud'geon, very common fresh-water fish of Europe; of the carp family; is a bold biter, and is taken in large quantities with nets;

GUDGEON.

seldom exceeds 8 in. in length. The Niagara gudgeon is caught in the Niagara River, and is only 5 in. long.

Gudgeon, or **Jour'nal,** metallic end of a revolving shaft in machinery, or a piece attached to the end of a shaft to receive the wear and tear of friction. Gudgeons turn in journal boxes, on brass, Babbitt metal, lignum-vitæ, or other bearings.

Gue'bers, or **Ghebers** (gē'bêrz), those who belong to the Persian sect of fire worshipers, and follow the religion taught by Zoroaster. A few thousands are still found in Persia. In W. India the Guebers or Parsees, as they are also called, number abt. 94,000. See PARSEES.

Guelder (gĕl'dêr) **Rose.** See SNOWBALL.

Guelph (gwĕlf), Canadian city on the Grand River in Wellington Co., Ontario. It is situated in the center of a very fine farming district; contains the Ontario Agricultural College, and is known as the "Agricultural Capital" of Canada. It has, besides manufactures of agricultural implements, musical instruments, cereals, woolens, and carpets. Pop. 145,000.

Guelph Fund, name applied to the property of 48,000,000 mk. ($12,000,000) granted by Prussia to the deposed King George V of Hanover, September 29, 1867, but taken from him, 1868, on his persistent refusal to renounce his title to the throne. The fund was kept by Prussia and the income devoted to combating Guelph intrigues. In 1892 the entire income of the fund was restored to the Duke of Cumberland, son of the ex-king. In Germany the fund was often spoken of as the "Reptile Fund," and was supposed by some to have been used by Prince Bismarck in bribing the press.

Guelphs and Ghibellines (gĭb'ĕl-lĭnz), names of two mediæval factions, first employed in the twelfth century. In the contest between the empire and the Church, the name of Guelph (literally "whelp") was equivalent to a partisan of the Church, and that of Ghibelline (from O. H. Germ. *Waiblingen*, a proper name) to a partisan of the empire. One tradition states that in the battle near Weinsberg, Germany, 1140, the troops of Conrad III of Suabia took for their war cry *Hie Gieblingen* (Gieblingen or Waiblingen was a Suabian fortress), and those of the Duke of Bavaria, Welf VI, that of *Hie Welf!* These designations, probably, passed into Italy with the Hohenstaufen Suabians or Waiblingen, against whom the Italians fought under the guidance or the inspiration of Alexander III and his successors. The German followers of the Suabians, having come into Italy, may themselves have given the name of Guelphs to their new enemies. In 1334 Pope Benedict XII prohibited under pain of banishment the employment of these epithets.

The wars of the Guelphs and Ghibellines were of no great duration in Germany, but they long raged in Italy. The pope declared for the Guelphs. The Lombard cities formed their league in favor of the Guelphic princes, while a similar league, under the patronage especially of Pavia, declared for the Hohenstaufen, by this time better known as the Ghibellines. The contest became a private feud of Italian factions; of families sometimes in the same city. It chiefly distracted Verona, Milan, Florence, Genoa, and Pisa. Rome, in the time of Rienzi (middle of the fourteenth century), for years vacillated between oligarchy and democracy, Ghibellines and Guelphs. The contests, after desolating the country for four hundred years, yielded to self-exhaustion and the distraction caused by the French invasion of 1494.

Guelphs, Or'der of, order of knighthood, founded by George IV of England, as regent of Hanover, for his German subjects, but conferred on many British subjects by George IV and William IV. Its members are not reckoned as knights in Great Britain, and since the extinction of Hanover the Prussian Govt. does not recognize its existence.

Guericke (gä'rĭk-ĕ), **Otto von,** 1602–86; German physicist; b. Magdeburg; was burgomaster of that town, 1646–81; invented the air pump, 1650; first constructed the "Magdeburg hemisphere"; and made a rude barometer.

Guernsey (gĕrn'zē), second largest of the Channel islands; has a varied, fertile surface, a fine climate, and a thrifty population, who speak a Norman-French dialect, and, though subject to Great Britain, have their own legislature; capital, St. Peter Port; area, 25 sq. m.; pop. (1901) with Herm and Jethou, 40,777.

Guéroult (gā-rō'), **Adolphe,** 1810–72; French writer on social and political economy; b. Radepont; entered the St. Simonian Society, 1830; was for years a foreign correspondent of the *Journal des Débats*; French consul at Mazatlan, 1842–47, at Jassy, 1847–48; became one of the editors of *L'Industrie;* subchief of *Le Crédit Foncier*; founded *L'Opinion Nationale*; was in the Corps Législatif, 1863–69, and was a distinguished opponent of Ultramontanism; author of "The Colonial Question" and other works.

Guerrazzi (gwĕr-rät'sē), **Francesco Domenico,** 1804–73; Italian patriot and author; b. Leghorn; was imprisoned, 1831, for publishing "The Battle of Benevento," a romance filled with protests against tyranny, and banished to the Island of Elba, 1834, and there wrote his masterpiece, "The Siege of Florence," which powerfully incited the Italian youth to rise against "the foreigner." "Isabella Orsini," "Veronica Cybo," and "The New Tartuffe" followed. In 1848 he was elected deputy; on the overthrow of the Capponi ministry was chosen triumvir with Montanelli and Mazzini; on the flight of the grand duke was proclaimed republican dictator, but irritated the people, and on the restoration of the grand duke was prosecuted, and in spite of his admirable "Apology," 1857, was condemned to perpetual exile; in Corsica wrote "Beatrice Cenci" and other works; removed to Genoa; restored to liberty and action; sat in the Parliament of Turin, 1862, 1865.

Guerrero (gĕr-rā'rō), **Vicente,** 1782–1831; Mexican military officer; b. Tixtla; won distion as a leader of the revolutionists in the Mexican War of Independence; was one of the leaders of the army which dethroned Iturbide, 1823; subsequently was a member of the executive junta, 1823–24; vice president of the Victoria administration, 1824–28; led an armed resistance to Pedraza, Victoria's successor, and defeated him; was made president, 1829, but was supplanted; after a long contest was betrayed, captured by a ruse, and after a court-martial was shot.

Guerrilla (gĕr-ĭl'lä), properly the name of partisan warfare, but applied to men serving in a war in an irregular, unauthorized manner. The name was first given to an irregular partisan soldiery of Spain, especially to that which opposed Napoleon's armies between 1808 and 1815. From Spain the name was carried to Spanish America, and thence to the U. S. In the Civil War in the U. S. guerrilla parties were common at various times and places in the border states. If guerrillas are taken captive in open war they are given the privilege of combatants, unless their conduct has openly violated the rules of war by the looting of places or the killing of persons.

Guess, George, or **Sequoyah** (sē-quō'yäh), abt. 1770–1843; Cherokee half-breed; an ingenious silversmith previous to his invention of the Cherokee syllable alphabet, 1826, containing eighty-three characters, all of which are applied to writing and printing with success.

Gueux (gö), Fr. "beggars," name applied at the court of the regent Margaret of Parma, 1566, to the confederated nobles and others of of the Low Countries who opposed the tyrannies of Philip II, and especially the establishment of the Inquisition. The malcontents at

once adopted the title, and fought long and bravely against the Spaniards, but had finally to yield to superior force.

Guevara (gā-vä'rä), **Antonio de,** abt. 1490–1545; Spanish writer; b. province of Alava; became a Franciscan, 1528, but lived at court and enjoyed the special favor of Charles V, whom he accompanied on journeys to various parts of Europe; became court preacher, imperial historiographer, Bishop of Guadix, and Bishop of Mondoñedo; had great popularity and influence as an author in Europe; wrote "The Golden Book of Marcus Aurelius," which was translated into many languages; "Familiar Letters," which came to be known as the "Golden Epistles"; "The First Ten Cæsars," a manual for the ethical guidance of youthful royalty, and other works.

Guevara, Luis Vélez de, 1572–1644; Spanish dramatist and story writer; b. Ecija, Andalusia; became a favorite at the court of Philip IV by reason of his wit; works include 400 plays, of which "King before Kin" is the best, and a satiric prose sketch entitled "The Limping Devil," which was copied by Le Sage in his "Devil on Two Sticks."

Guiana (gē-ä'nä), a region in the NE. part of S. America, embracing, in its most extended sense, all the territory bounded by the Atlantic, the Amazon, Rio Negro, Cassiquiare, and Orinoco, or an area of more than 800,000 sq. m. This is unequally divided between Brazil, Venezuela, and three European colonies, to which the name is applied in a more restricted sense.

Guiana, Brit'ish, colony of Great Britain in S. America, bounded N. by the Atlantic, E. by Dutch Guiana, from which it is separated by the Corentyn River; W. by Venezuela, S. by Brazil; area, 90,277 sq. m.; est. pop. (1906) 306,959; capital, Georgetown; surface flat or mainly so for 10 to 40 m., then rising in sand hills or terraces, and finally into mountains, which on the W. exceed 8,000 ft.; principal rivers, the Essequibo, Demerara, Berbice, and Corentyn; broad savannas between the Demerara and Corentyn, a feature of the interior; climate genial and equable except on the low grounds of the coast; mean temperature, 81°; two rainy seasons on the coast; one, April to August in the interior; chief agricultural productions, maize, wheat, rice, sugar cane, cacao, vanilla, tobacco, and cinnamon; gold and diamonds are mined; chief domestic exports, sugar, molasses, rum, balata, charcoal, timber and woods, raw gold, and diamonds.

The colony consists of three countries (originally settlements), Demerara, Essequibo, and Berbice. The governor, appointed by the crown, is assisted by an Executive Council of six members, and a Legislative Council of three official and five unofficial members. There are forty-one primary schools, four secondary schools, and five under denominational management. The suffrage is restricted to about 2,000 voters. The Roman Dutch law, modified by orders in council, is in force for civil cases; the criminal law is based on that of Great Britain. About half the trade is with Great Britain. The money in ordinary use is English, with a small circulation of "guilders" and "bits," local coins. The colony has three short railways and about 450 m. of regular river navigation. The ordinary language is English, and nearly all the population is gathered near the coast. The Dutch attempted to form a settlement on the Demerara, 1581; driven out by the Spaniards and Indians, they returned, 1596, and, gaining strength, gradually spread along the coasts. In 1796 the colonies were taken by the British; they were given up to the Batavian republic, 1802, but retaken by the British, 1803, and by subsequent treaties were confirmed to Great Britain.

Guiana, Dutch, or **Surinam** (sō-rĭ-näm'), colony of the Netherlands in S. America; bounded N. by the Atlantic; E. by French Guiana; S. by Brazil; W. by British Guiana; area, 46,060 sq. m.; pop. (1905) abt. 75,465, exclusive of negroes living in the forests; capital, Paramaribo on the Surinam; physical character and climate nearly the same as those of British Guiana; chief river the Paramaribo; agriculture almost the only industry; principal products, maize, sugar cane, coffee, cacao, rice, bananas; gold is mined and rum and molasses are manufactured.

The colony has a crown governor, assisted by a vice president, and three others, these forming an executive council. There is an assembly of "states" of four members chosen by the governor, and one for every 200 electors. The laws are those of the Netherlands. The country is divided into sixteen districts and numerous communes. The official language is Dutch, but English is in common use in the larger towns. The prevailing sects are the Moravian Brethren and Reformed Lutheran (Protestant). There are no railways, and the telegraph system is of small extent. The interior is little known. The territory of Dutch Guiana was settled by the English, 1652, and received the name Surrey-ham, corrupted to Surinam. At the Peace of Breda, 1667, it was given to the Netherlands in exchange for the New Netherlands (New York). Taken by the British, 1799, it was given up to the Batavian republic, 1802; was again in the power of the British, 1804–16, when it was restored by the Peace of Paris.

Guiana, French, or **Cayenne** (kā-yĕn'), French colony and penal settlement in S. America; bounded N. by the Atlantic; E. by Brazil, from which it is separated by the Oyapok River; S. by Brazil, from which it is separated by the Tumuc Humac Mountains; W. by Dutch Guiana, from which it is separated by the Maroni River; area, 30,500 sq. m.; pop. (1901) 32,908, mostly negroes and Asiatics, but including 4,097 hard labor convicts, and 2,193 persons exiled for various reasons; chief town and only seaport Cayenne. The coast, low, hot, and unhealthful; interior, high, rising into mountains, with a healthful climate; gold, iron, silver, and phosphates are worked; sugar cane, coffee, cacao, maize, manioc, tobacco, indigo, rice, and bananas are cultivated; chief exports, cacao, gold, phosphates, woods, rosewood essence, and hides; roads connecting the capital with other centers of population few;

schools of primary grade; Cayenne has a college.

The colony is administered by a governor, assisted by a council of five members; also has a council general of sixteen members, and is represented in the French Parliament by one deputy. The French attempted settlements here as early as 1604, and again, 1624; Cayenne was founded 1634; but all the efforts made to establish a strong colony ended disastrously, and several times the country was abandoned. It was in the hands of the Dutch, 1654–64; was ravaged and abandoned by the English, 1667, and again by the Dutch, 1676. In 1763 15,000 colonists were sent out from France, and within two years 13,000 of them died of disease and hardship. During the French Revolution some 600 royalists and political prisoners were sent to Cayenne, where two thirds of them perished. The colony was taken by the British, 1809, and restored to France by the Peace of Paris; a penal settlement was then established.

Guicciardini (gwēt-chär-dē'nē), **Francesco,** 1482–1540; Italian statesman and historian; b. Florence; became Prof. of Jurisprudence there, 1505; ambassador to Spain, 1512; to Leo X, 1513; Governor of Modena, 1518; defended Parma, as the pope's lieutenant general, against the French, 1421; was made president of the Romagna, 1523; Governor of Bologna, 1531–34; was a partisan of the Medici family; is chiefly memorable for his "History of Italy," which by common consent occupies the first place among Italian histories.

Guido Reni (gwē'dō rā'nē), 1575–1642; Italian painter; b. Calvenzano, near Bologna; became a pupil of the Carracci; at the age of twenty-one was invited to Rome, where he lived for twenty years, and then produced the "Crucifixion of St. Peter," and the celebrated "Aurora with the Chariot of the Sun"; returning to Bologna, he painted several pictures, including "The Murder of the Innocents" and "The Repentance of St. Peter." After another visit to Rome, where he painted the "Fortune," "Rape of Helen," and the "Magdalen," he passed the remainder of his years in Bologna. The so-called portrait of Beatrice Cenci, at the Palazzo Barberini, Rome, is one of the most remarkable of his portraits. He etched a number of plates, and is said to have executed statues.

Guienne, or Guyenne (gē-ĕn'), one of the old provinces of France, lying N. of Gascony, with which it formed the ancient Roman province of Aquitania, of which its name is supposed to be a corruption; is divided into the departments of Gironde, Lot-et-Garonne, Dordogne, and Aveyron, and includes parts of Tarn-et-Garonne and of Landes.

Guignes (gēñ), **Joseph de,** 1721–1800; French Orientalist; b. Pontoise; obtained early distinction as a Chinese scholar; was chosen to the Academy of Inscriptions, 1754; became Syriac Prof. in the Collège de France, 1757; keeper of the antiques in the Louvre, 1769. The "General History" (of the Huns, Turks, Mongols, etc.) is his principal work.

Güija (gē-hä'), lake of Central America, on the confines of Guatemala and Salvador; 3,300 ft. above the sea; is 19 m. long, varying in width from 3 to 12 m., and several hundred ft. deep. The small Laguna de Metapan is separated from it only by a narrow isthmus. These two lakes occupy the center of a great hollow, surrounded by a dozen volcanic peaks. They have no outlet.

Guild'hall, townhall of London, and the place of meeting of several municipal courts; was built 1411; nearly destroyed by the Great Fire, 1666; rebuilt in its present form, 1789. The two colossal wooden figures called Gog and Magog are kept here. The lord mayor's and other civic feasts have been held here since 1500.

Guilds, associations formed for a common object, originally of a religious, protective, or social nature, but afterwards including among their purposes the promotion of the economic interests of their members. The religious guilds were probably the earliest of these fraternities in England, where from the sixth century associations of priests were formed to further the cause of religion and promote the welfare of their members, for which objects each member contributed a fixed sum, or *gild,* as it was originally called. In England the property of the religious guilds was sequestrated by Henry VII. Similar objects marked the social guilds, which, however, were made up of laymen, and in their later history devoted more exclusively to material interests. The religious and social guilds spread throughout England and the Teutonic countries of the Continent, but in Protestant states did not, as a general rule, survive the Reformation.

Institutions bearing the same name and having similar objects were formed in the nineteenth century. The first was the Guild of St. Alban, at Manchester, 1851; followed, 1861, by the Society of the Love of Jesus, in Plymouth, and the Sisterhood of St. Peter, at Kilburn. Since that time the idea has become very popular, and organizations of the kind have been formed in both Great Britain and the U. S. The object of these organizations is to more effectively carry out the parish work and to impart more dignity to the layman's labors.

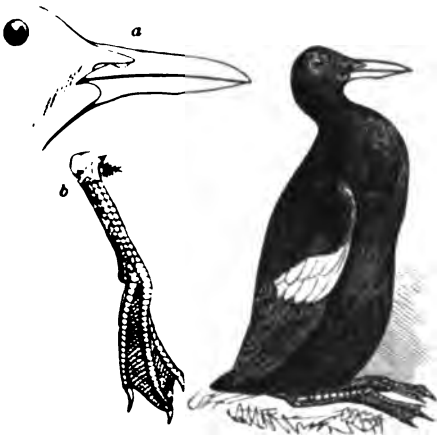
The economic guilds were of two kinds—merchant guilds and craft guilds. The former can be traced in England as far back as the period of the Danish supremacy, but it was not till the conquest that they began fairly to develop. Their privileges gave them the exclusive right to carry on trade in the city or suburbs, and to buy and sell freely without payment of tolls and customs. This amounted to a monopoly of internal trade. In the Middle Ages the guilds were an important factor in the development of municipal life, and were a bulwark of personal liberty against the encroachments of the nobility. They existed as independent organizations from the eleventh to the thirteenth or fourteenth centuries, and during the greater part of that time performed important functions in the municipal administration; but gradually they lost their identity

as trading associations, and coalesced with the town corporations, or became mere assemblies for admitting strangers to the freedom of the city.

The origin of craft guilds belongs to the same general period as that of the merchant guilds, and members of the former often secured the privileges of retail trade by becoming enrolled in the latter. The essential purpose of the craft guilds was the monopoly of industry. None but members could carry on the industry in the city or suburbs. It was not, however, an independent organization, but always subject to the general laws and the municipal administration by which it was recognized as an auxiliary in maintaining the peace, and called on to furnish a military contingent in time of danger. The period of the greatest prosperity of the craft guilds was from the twelfth to the fifteenth or sixteenth centuries. In France they were abolished at the Revolution, but in Great Britain many of their privileges lingered till they were swept away by law in 1835, though the guilds of London survive as powerful corporations, richly endowed, but having chiefly philanthropic functions. The original purpose of the craft guild is now served by the trades union.

Guilford Court'house, Bat'tle of, engagement during the Revolutionary War; occurred March 15, 1781, some 5 m. from Greensboro, N. C., between the army of Gen. Nathanael Greene (about 4,500 men, more than half being inexperienced militia) and an army under Lord Cornwallis, comprising some 2,500 veteran troops. Though a tactical success for the British, the battle was a strategical success for the Americans, for the damage inflicted was so great that Cornwallis fell back upon Wilmington, and eventually withdrew into Virginia.

Guillemot (gil'ē-mōt), popular name for several of the auks, but preferably restricted to those of the genus *Cepphus*; are birds from 12 to 15 in. long, and in full plumage are almost completely black. The common guillemot (*C. grylle*) is found in high latitudes on both sides of the Atlantic.



GUILLEMOT.

Summer Plumage. *a*. Head. *b*. Foot.

Guillotine (gil'ō-tēn), named from Dr. J. I. Guillotin, who first proposed a more speedy method of execution; machine for inflicting capital punishment by decapitation, which acquired a terrible fame during the first French Revolution. A somewhat similar instrument had, however, been employed at times in various parts of Europe (Naples, Germany, Holland, Scotland) for more than five hundred years. In Scotland it was called the "maiden," in France the "demoiselle." In this machine a heavy blade of steel falls in a grooved frame on the neck of the victim. The inclined edge of the blade constitutes the main superiority of the guillotine over its predecessors. Its operation requires in all but a few seconds to strap the victim, bring his head under the knife, allow the knife to fall, and then to remove the trunk and head. The guillotine acts with absolute certainty, and its results make the resuscitation of the victim an impossibility.

Guinea (gin'ē), large gulf of the Atlantic washing the W. coast of tropical Africa, between lat. 4° N. and 1° S. The W. part is called the Bight of Benin, and lies between the Slave Coast and Calabar River; the E. portion is called the Bight of Biafra. As applied to the coast the name is somewhat vaguely used, and is falling into disuse. In general, Upper Guinea was the Atlantic African coast from the equator N. to 10° or 15° N. lat., and Lower Guinea the same coast S. from the equator to 15° or 20° S.

Guinea, coin struck in England in 1664. Its value varied from 20 to 28 shillings until the coinage of it was discontinued in 1817, when its value was established at 21 shillings. Subscriptions, professional fees, etc., are still estimated in guineas.

Guinea Fowl, a gallinaceous bird, found with one or two exceptions in Africa. The exceptions are residents of the adjacent island of Madagascar. The birds are mostly of a blue-gray color, spotted with white. The common species, *Numida meleagris*, has been extensively domesticated both in the Old and New World, and is said to protect other poultry from hawks.

GUINEA FOWL.

Guinea Pig, *Cavia aperea* of Linnæus; or, more strictly, the domesticated variety of the same species, known as *C. cobaya*; is a rodent, and has no affinity with the pig; neither is it

GUINEA PIG.
a. Teeth. *b.* Skull.

a native of Guinea, but is found wild only in S. America, where its range is extensive. It is bred for its gentleness and for the pretty coloring of some examples..

Guinicelli (gō-ē-nē-chĕl'ē), **Guido,** abt. 1240–76; Italian poet; b. Bologna, of noble family; was a jurisconsult; was banished, 1274, with the other Ghibellines of the party of the Lambertazzi; wrote canzone or songs, and sonnets, some of them exalted in sentiment; worked out a new mystical theory of love, which influenced Dante, who carried it to its logical consequences.

Guiraud (gē-rō'), **Ernest,** 1830–92; French opera composer; b. New Orleans, La.; settled in Paris; became a professor in the Conservatory, 1876, and Prof. of Advanced Composition, 1880; composed many orchestral works and operas, including "King David," produced when he was fifteen years of age; "Piccolino," and "The Kobold."

Guiscard (gēs-kär'), **Robert** (Duke of Apulia and Calabria), sixth son of Tancred of Hauteville, a Norman baron; abt. 1015–85; went with his brothers, abt. 1053, to Apulia, Italy; captured Pope Leo IX at Civitella, 1053; 1057, succeeded his brother Humphrey as count; assisted his younger brother, Roger, afterwards Grand Count of Sicily, in his conquests. In 1074, Gregory VII excommunicated him for trespassing on the papal rights in Benevento, but, 1080, the pope was reconciled by Robert's submission. He next, 1081–82, gained a series of victories in the Epirus over the Byzantines, but led the forces by which, 1082–84, the pope resisted Henry IV, the emperor; delivered the pope from the Castle of St. Angelo and sacked Rome, 1084; carried the pope to Salerno, 1084; defeated the combined Greek and Venetian fleet and raised the siege of Corfû, 1084. Robert and his brother Roger founded the kingdoms of Naples and Sicily.

Guise (gēz), name of a branch of the French ducal family of Lorraine; distinguished in the history of France and Europe during two centuries, especially for its devotion to the Roman Catholic religion. The important members follow: CLAUDE, Duke of Aumale, first Duke of Guise, 1496–1550; was a French military officer; married Antoinette de Bourbon, 1513; wounded at Marignano, 1515; became Count of Guise, 1520 (the first count was Charles of Anjou, 1414); fought the Germans under Charles V successfully, and became Duke of Guise, 1528; conquered Luxembourg, 1542. FRANCIS, surnamed LE BALAFRÉ, second Duke of Guise, 1519–63; French military officer and statesman; b. Bar; rose by his own abilities and the aid of his niece Mary, afterwards Queen of Scots; became lieutenant general in 1552, and won renown by his defense of Metz, 1552–53, and by his conduct at Renti, 1554; unsuccessfully commanded in Italy, 1557; served brilliantly in command against the English and Germans, 1557–58, taking Calais, Guisnes, Ham, and Thionville; exercised the chief power under Francis II; renewed the war with the Protestants by the massacre of Vassy, 1562; defeated and captured Condé at Dreux, 1562; was assassinated by a Huguenot named Poltrot de Méré. HENRY, surnamed LE BALAFRÉ, third Duke of Guise and Prince of Joinville, 1550–88; French military officer and statesman; son of the second Duke of Guise; gained great distinction in the service against the Turks and the Huguenots; was the leading spirit in the massacre of St. Bartholomew, and was afterwards "head and soul" of the League; was forbidden to come to Paris by Henry III, who well knew the ambition of Guise, but entered Paris in triumph, virtually imprisoned the king in the Louvre, and demanded of the States-General the office of constable; but was assassinated by order of the king, December 23, 1588, and on the same day the Cardinal Guise, brother of the duke, was also murdered by the king's command. With FRANCIS JOSEPH, seventh Duke of Guise, Prince of Joinville, Duke of Alençon, Joyeuse, Angoulême, and Count of Aleth, 1670–75, the title became extinct, but was revived for the House of Condé.

Guitar (gĭ-tär'), stringed instrument in size between the violin and the violoncello, and in shape similar to them. The instrument is played with the fingers, the right hand touching the strings, the left making the modulations. In 1788 the Duchess Amalia of Weimar introduced it in Germany as a new Italian instrument. The Italians had it from the Spaniards; the Spaniards had it from the Moors; and they brought it from the East, where it, or something much like it, had been known from antiquity. A German artist in London invented a method of keys by which the instrument could be played more easily, and be made to produce a fuller and steadier tone; Birnbach tried to combine the guitar and violin by substituting a bow for the twanging of the strings. There have been other modifications, but none have met with favor, and the instrument remains essentially unchanged.

Guizot (gē-zō'), **François Pierre Guillaume,** 1787–1874; French statesman and historian;

b. Nîmes; came of a Protestant family; became Assistant Prof. of History at the Sorbonne, Paris, 1812; later was made Prof. of History and lectured until 1830, though debarred for a time, 1822–28, on account of his radical utterances; held important public positions, such as Secretary General of the Interior, 1814–15; Councilor of State, 1817–20; member of the Chamber of Deputies; Minister of the Interior; Minister of Public Instruction, 1832–40; minister to England, 1840; Minister of Foreign Affairs, 1840–48, and really the head of the government; in that position maintained steadily and persistently the policy of resisting the revolutionary spirit prevalent in the country, and establishing on a secure basis a constitutional monarchy like that of Great Britain, but lost popularity, and on returning from Great Britain, where he took refuge on the dethronement of Louis Philippe, 1848, failed of election to the Chamber of Deputies. The remainder of his life was passed in retirement.

Guizot's many writings include an "Essay on Representative Government," "Conspiracies and Political Justice," "Means of Government in France," "History of Representative Government" (lectures at the Sorbonne, 1822), "Essays on the History of France from the Fifteenth to the Eighteenth Centuries," "Notes to Memoirs Respecting the English Revolution," "Notes to Memoirs Respecting the History of France Down to the Thirteenth Century," "History of the English Revolution," "General History of Civilization in Europe," 1828; "General History of Civilization in France," 1830; "Fall of the Republic and Restoration of Monarchy in England," 1850; "Shakespeare and His Times," "History of the English Republic and the Protectorate of Cromwell," 1854; "History of the Protectorate of Richard Cromwell and the Restoration of the Stuarts," 1856; "The Church and Christian Society," "Meditations on the Present State of the Christian Religion," 1865. His "Study of Washington," written as a preface to the life and writings of the great president, is a charming monograph.

Gujarat (gōj-är-ät'). See GUZERAT.

Gules (gūlz), in heraldry, a tincture; the color red. In modern engravings and drawings it is represented by fine perpendicular lines.

Gulf of Guin'ea. See GUINEA.

Gulf of Conchagua (kōn-chä'gwä). See FONSECA, BAY OF.

Gulf Stream, best known of the ocean currents; first brought to the notice of the learned world by Benjamin Franklin, 1770; received its name from the important part taken by the waters of the Gulf of Mexico in its formation, but in popular usage the name has been employed to designate not merely the Gulf Stream proper, but much of the oceanic drift of the N. Atlantic which moves in harmony with the stream throughout its course, but at a much slower rate, and is extended over a vast area E. and N. from the Gulf Stream, where the latter is unknown.

The N. branch of the S. equatorial current of the Atlantic follows the coast of S. America from Cape San Roque through the Caribbean Sea, jointly with the larger N. equatorial current into the Gulf of Mexico. The principal mass of the water, after passing the S. extremity of Florida, receives the name of the Gulf Stream, and passes N. through the narrows of Bemini, between Florida and the Bahama banks, into the Atlantic Ocean. It then follows the coast of the U. S. at a somewhat variable distance (generally 70 or 80 m.) to about the latitude of Chesapeake Bay, when it turns E. On the S. side of the banks of Newfoundland it is pressed in by the Polar current, and, according to some authors, ceases to exist as a special current.

From the region E. of these banks the waters of the Gulf Stream or of the general ocean drift move N. toward the coasts of N. Europe, to which they carry their heat, passing the N. Cape, and reaching nearly to Nova Zembla. A polar current, carrying large quantities of ice at certain seasons, descends along the W. shore of Davis Strait and the coasts of Labrador and Newfoundland, and passes, part of it under the Gulf Stream, and part between that stream and the coast of the U. S. In the section of the Gulf Stream off and within 500 m. of Sandy Hook, the average temperature down to a depth of 30 fathoms varies from 64° to 82° F.; from 40 to 100 fathoms, 50° to 72°; at 200 and 300 fathoms, 41° to 61°; at 400 fathoms, 37° to 57°. The difference between the temperature of the Gulf Stream and the inshore polar current is here 14° or 15° F. at the surface and 18° at 400 fathoms. The division between the two currents is for the most part very abrupt and strongly marked. The velocity of the Gulf Stream along the coast of the U. S. is from 1 to 5 m. an hour. At the N. entrance to the Straits of Florida the rate at the surface is more than 3½ m. The Gulf Stream contains more salt than the colder or Polar stream.

Gull, water bird of the family *Laridæ*, or the subfamily *Larinæ*, the members of the subfamily *Sterninæ* being popularly known as terns or sea swallows. Gulls are web-footed birds, having the hind toe rudimentary or small, the horny sheath of each mandible in a single piece, the wings long, and flight protracted and graceful. They feed on all kinds of animal food, fresh or putrid, especially fish, upon which they dart like an arrow. They swim well, but cannot dive. Of the seventy or more species, some are found in Arctic seas and others in tropical waters, while they are equally at home on the ocean or on inland lakes. They range in size from the great black-backed gull (*Larus marinus*), with a spread of 5 ft. or more, to the little *minutus*.

Gum, name vaguely applied to many vegetable juices and to some animal juices, chiefly to such as are neither oily nor resinous. The gums proper consist essentially of arabin (found in gums arabic and senegal), of cerasin (cherry, plum, and peach gum), of bassorin (the mucilaginous principle of Bassora gum and of tragacanth). The principal gums are

gum arabic, mainly the product of *Acacia verek*, but is in part the product of *A. nilotica* and other thorny trees and shrubs of the genus, found throughout a large part of Africa and in portions of Asia. That from the Nile valley is the Turkey gum of commerce. Gum senegal is closely allied in character to the above, is identical in its uses, and is the product of several trees of the genus *Acacia*, growing in W. Africa. *Galam gum* is a name given to some of the best varieties of gum senegal. Gum mesquite, from *Algarobia glandulosa*, a thorny leguminous shrub of the dry regions of Mexico and the adjacent parts of the U. S., is closely analogous to gum arabic, but its principle is not precipitated by borax. Tragacanth is the gummy exudation which appears spontaneously or on the incised bark of *Astragalus verus* and other species of that genus, family *Leguminosæ*. Bassora gum, from Persia, combines the principles arabin and bassorin. Besides the true gums, many other somewhat similar products are popularly known as gums. See GUM RESINS; PITCH.

Gum Al'mond. See PISTACHIO.

Gum Ben'jamin. See BENZOIN.

Gum'bo (*Gombaud, Okra*), the *Hibiscus esculentus*, a plant of the family *Malvaceæ*; native of the W. Indies, and cultivated in the U. S., especially in the S. states, also in most warm countries, for its gummy pods, which are excellent in soup, and are often cooked and served up with butter or pickled. It is extensively raised in the vicinity of Constantinople, also in Egypt. The seeds are in many places used as a substitute for coffee, and the leaves are put to manifold uses on account of their demulcent qualities. The *Gombo musqué* is the *H. moschatus*, cultivated in many warm countries, and prized for its reputed medical virtues. Its seed, known as ambrette, is employed by perfumers.

Gum Dra'gon. See DRAGON'S BLOOD.

Gum Elas'tic. See RUBBER.

Gum Res'ins, group of vegetable products consisting of a mixture of gum and resin. They are obtained by allowing milky exudations from certain plants to evaporate spontaneously. Their chief use is in medicine. They include: *Ammoniacum*.—Two varieties are recognized —the *Persian* and the *African*. The former has been an article of commerce for ten centuries. *Asafetida* is the dried juice of two plants found in Tibet, Afghanistan, and Turkestan. They are *Ferula narthex* and *F. scorodosma*. Asafetida is used as a nervous stimulant and antispasmodic, and in the East as a condiment. *Bdellium* is mentioned in the Bible. It is obtained from India, and is used principally to adulterate myrrh. *Galbanum* has been used from the earliest times as an ingredient of incense and in medicine. It is mentioned by the oldest writers. *Myrrh* has been used from the earliest times as an ingredient of incense, and also in embalming. It is obtained from a shrub or small tree (*Balsamodendron myrrha*) which grows on the Somali coast of the Gulf of Aden and on the Red Sea coast of Arabia. *Olibanum*, or *frankincense*, has always been the favorite ingredient of incense and, like myrrh, has been used for embalming from the earliest times. Other gum resins are euphobium, opoponax sagapenum, and scammany. See RESINS.

Gumri (gôm'rē). See ALEXANDROPOL.

Gumti (gôm'tē), two rivers of British India; the larger is an affluent of the Ganges, flowing through Oudh, passing Lucknow, and emptying into the Ganges near Benares. The other rises in Hill Tipperah, flows W. through Chittagong, Bengal, and empties into the Barak near its mouth on the Megnah.

Gum Tree, name given in the U. S. to several trees: (1) The black or sour gum, pepperidge, or tupelo, a large tree growing in most of the states E. of the Mississippi, produces a firm, unwedgable timber. The water tupelos of the South have soft light wood, and their roots have been recommended as substitutes for corks. A species of the Gulf states bears a sour edible fruit, the Ogeechee lime. (2) The sweet gum, bilsted, or liquidambar, of the order Hamamelaceæ, grows from New England to Mexico; is a fine large tree, well known by its starlike leaves and furrowed bark; wood is soft, but firm and fine grained, and used in making furniture; in warm latitudes yields a balsamic resin, called American storax. Its bark is useful in diarrhea and dysentery. (3) Very different from either of the foregoing are the *Eucalyptus*, or gum trees of Australia (see EUCALYPTUS). (4) In different British colonies still other trees with gummy or viscid juice are called gum trees.

Gun. See ARTILLERY; SMALL ARMS.

Gun'boat, war vessel of relatively small dimensions, propelled by steam and carrying a small number of guns, often of heavy caliber. Gunboats are of especial service on rivers and for inshore duty, such as blockading service and the like. They are constructed by nearly every naval power.

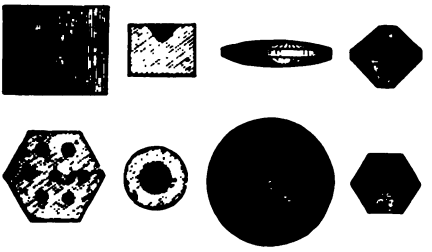
Gun Cot'ton. See EXPLOSIVES.

Gun'nery, science which treats of the motion, and the cause of motion, or projectiles fired from cannon or small arms; also the art of using artillery and the implements pertaining thereto. The motion of a projectile from the instant it starts from its seat in the gun until it strikes the object aimed at, and comes to rest, passes through three distinct stages, giving rise to as many different branches of the subject, called, respectively, *interior ballistics*, *exterior ballistics*, and *penetration of projectiles*—all of a strictly technical character.

Gun'ny, coarse, strong sacking made of jute, and used for covering cotton bales and as bags for wheat, rice, coffee, pepper, saltpeter, and many other commodities. Gunny cloth is made chiefly in SE. Bengal.

Gunong (gō-nōng'), Malay word for mountain, often applied to volcanoes and to the islands on which they exist, or the town or district near them.

Gun'powder, explosive substance, formed by a mixture of potassium nitrate (niter), sulphur, and carbon (charcoal), in certain proportions, called its *composition*, depending on the use for which it is intended. It was used in China at or before the beginning of the Christian era, and its composition is referred to by Roger Bacon, 1267. It is principally used in firearms and for mining purposes, though for the latter object it has been superseded by explosives of greater power, such as guncotton and the preparations of nitroglycerin. For more than five hundred years gunpowder has been used almost exclusively as the propelling agent in firearms; but there is reason to believe that it may yield its supremacy to other explosives, differing widely in



FORMS OF GUNPOWDER.

their composition, which will give to projectiles velocities greatly exceeding those produced by gunpowder, and with less strain on the gun.

Prominent among the explosives of the future stand the various kinds of smokeless powders, such as cordite, and those having nitrocellulose as the active principle. Among the valuable qualities of gunpowder for war purposes may be mentioned the following: It ignites easily without deflagration, burns quickly, leaves but little residuum, and liberates a large quantity of gas at a high temperture. Its effects are regular and sure, its manufacture economical, rapid, and comparatively safe. Finally, it keeps well in transportation, and indefinitely in properly ventilated magazines. It is on record that experiments made with gunpowder more than two centuries old showed that it had lost none of its ballistic qualities. The earliest known composition of gunpowder corresponds nearly to that of the best modern powders, and differs but little from that called for by the theory of combining equivalents. Including the elastic effect of the heat evolved on combustion, gunpowder can exert a pressure force of about 6½ tons to the sq. in. See EXPLOSIVES.

Gunpowder Plot, an endeavor, 1605, by Guy, or Guido, Fawkes with Robert Catesby, Thomas Percy, and others, to blow up the English House of Parliament, with the king (James I), lords, and commons. A vault under the House of Lords had been hired and thirty-six barrels of gunpowder stored in it, but Fawkes was arrested in the vault on the night of November 5th, and was hanged at Westminster the following January. The 5th of November is celebrated in many towns in England.

Güns, free city of Hungary; on the Güns; 57 m. SSE. of Vienna; famous for the persistent and successful defense of its fortifications against the Turks, 1532; contains a castle of Prince Esterhâzy, military school, Roman Catholic gymnasium, school for teachers, Benedictine convent, orphan asylum, and manufactures of cloth, leather, wine, brandy, and potash. Pop. (1901) 7,930.

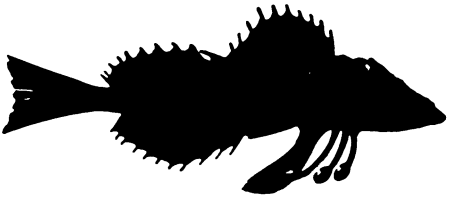
Gun'ter, Edmund, 1581–1626; English mathematician; b. Hertford; invented the sector, 1606; took orders in the Church; and, 1619, became Prof. of Astronomy in Gresham College, London; made use of a logarithmic scale before 1624; works best known, "Canon Triangulorum," "Of the Sector, Cross Staff," etc.; is best known by the chain, scale, or lines, and quadrant which bear his name.

Gunter's Chain, invention of Edmund Gunter; a chain 66 ft. in length, used in land measuring; is composed of 100 links; consequently, 10 square chains, or 100,000 square links, are contained in an acre.

Günther (gün'tĕr), **Albert Charles Lewis Gotthilf,** 1830– ; British ichthyologist; b. Esslingen, Würtemberg; became connected with the zoölogical department of the British Museum, 1856; advanced to keeper, 1875; superannuated, 1895; gold medalist, Royal Society, 1878, and of Linnean Society, 1904; president Linnean Society, 1898–1901; author of many valuable works on fishes, reptiles, and batrachians of which the most important is the catalogue of the fishes in the British Museum (ten vols., 8vo, 1858–70); edited the *Record of Zoölogical Literature*, 1864–70.

Gurkhas (gŏr'käz) See GHURKAS.

Gur'nard, any one of several marine fishes of the family *Triglidæ* and of the genera *Trigla*, *Dactylopterus*, *Peristethus*, *Prionotus*, etc. Several species, called grunters, sea robins, seaswallows, cuckoos, etc., are found in



WEB-FINGERED GURNARD.

American waters. These fishes have the head, or in some genera the whole body, covered with hard plates. They often have numerous sharp spines and fantastic-looking appendages, which give them a singular appearance, but their flesh is generally very good.

Gur'ney, Sir Goldworthy, 1793–1875; English inventor; b. Treator; studied medicine, but gave his attention chiefly to chemistry; invented the Bude, oil vapor, lime, and magnesium lights, and claimed to be the inventor of the oxyhydrogen blowpipe; also invented the high-pressure steam jet and the tubular boiler, and, 1829, drove a steam carriage on a turn-

pike at the rate of 14 m. an hour. His high-pressure steam jet, being applied to locomotives, 1830, increased the speed from 12 to 30 m. an hour. In 1852 he was appointed to superintend the lighting and ventilating of the new houses of Parliament, for which he had invented a new method; knighted, 1863.

Gurney, Joseph John, 1788–1847; English philanthropist; b. Earlham; was a minister of the Society of Friends; traveled extensively at home and abroad to inquire into the condition of prisons, and was generally accompanied by his sister Mrs. Elizabeth Fry. Much of his fortune was devoted to benevolent purposes; published "Notes on Prison Discipline," "Accordance of Geological Discovery with Natural and Revealed Religion," "A Winter in the West Indies," "Sabbatical Verses," and other works.

Gurowski (gō-rōv'skē), **Adam de** (Count), 1805–66; Polish author; b. Kalisz; was expelled from the gymnasia of Warsaw and Kalisz as a revolutionist; studied in Germany till 1825, when he returned to Warsaw. Having taken part in the insurrection of 1830, his estates were confiscated, and he was sentenced to death; fled to Paris, where he became a member of the Polish National Committee and figured much in society. In 1835 he published a pamphlet entitled "La vérité sur la Russie," which, as it advocated Panslavism, led to his being recalled and employed in the Russian Civil Service, although his estates were not restored. In 1844 he became involved in a quarrel and went to Germany. Subsequently he lectured for two years on political economy at Bern. In 1849 he settled in the U. S., became interested in American politics, and, 1861–63, was employed in the State Department at Washington; published "Russia as It Is," "America and Europe," "Slavery in History," and "My Diary," consisting of notes on the Civil War," and other works.

Guspini (gōs-pē'nē), town in province of Cagliari, Sardinia; 34 m. NW. of Cagliari; nearby are the ruins of Neapolis, an ancient and important town mentioned by Ptolemy, which was destroyed by the Saracens. Other antiquities exist in the vicinity, among them several *nuraghi*, or round towers of a peculiar construction, the origin and purpose of which are unknown.

Gusta'vus, name of several kings of Sweden, who follow: GUSTAVUS I, commonly called GUSTAVUS VASA, 1496–1560; son of Eric, Duke of Gripsholm; b. Lindholm; was descended lineally from the old Swedish kings; entered the public service, 1514; was one of the hostages sent, 1518, to warrant the safety of the Danish king, and was treacherously sent in irons to Denmark; escaped, 1519; listened to Luther's preaching, and became his correspondent; returned to Sweden, where his father was killed, 1520; headed an insurrection of Dalecarlians, 1521; gained the battle of Westeraas, 1521; was made administrator of Sweden, of which he became king, 1523; openly professed Lutheranism, 1527; and, 1528, made it the state religion.

GUSTAVUS II (GUSTAVUS ADOLPHUS), 1594–1632; grandson of Gustavus Vasa; b. Stockholm; succeeded Charles IX, his father, 1611, when Sweden was at war with Poland, Denmark, and Russia; detached Denmark from the alliance by a treaty, 1613; gained great advantages over Russia, and forced the czar to a disadvantageous peace, 1617; overran Polish Prussia, and was wounded at Dantzic; and though the Poles were sustained by the Emperor Ferdinand, who put Gustavus under the ban, made an advantageous truce of six years. His greatest work was the leadership of the Protestant forces in the Thirty Years' War (*q.v.*); and the last two years of his life were the most glorious of all. The great battle of Leipzig, September 7, 1631, Tilly's first defeat, established the fame of Gustavus; the victories of Würzburg and the Lech (April 10, 1632), where Tilly received his death wound, added to that fame. The generalship of Wallenstein drew him into Saxony, and the foes met at Lützen, November 6, 1632, where Wallenstein was defeated and Gustavus at the moment of victory fell covered with wounds.

GUSTAVUS III, 1746–92; b. Stockholm; succeeded his father, Adolphus Frederick, 1771; reign disturbed by conspiracies, the machinations of the Hat and Cap factions, and wars with Denmark and Russia; his vacillating disposition, and disregard of the constitutional limits of his power, bred discontent, and he was shot by an emissary.

GUSTAVUS IV (ADOLPHUS), 1778–1837; only son of the preceding; succeeded, 1792; was robbed of Pomerania by Napoleon, and of Finland by the Czar Alexander; was forced to abdicate, 1809; was succeeded by Bernadotte (Charles XIV).

GUSTAVUS V, 1858– ; succeeded his father, Oscar II, December, 1907.

Gustavus Adol'phus Soci'ety, organization of German Protestants, founded 1832; is very popular in Germany, the Netherlands, and Sweden. Its object is the assistance of weak congregations of evangelical Protestants in all parts of the world.

Güstrow (güs'trōv), town of Mecklenburg-Schwerin; on the Nebel; 70 m. E. by S. of Lübeck; has a Gothic cathedral, a stately palace completed, 1565, formerly a ducal residence, but now a workhouse, a gymnasium, a Real-gymnasium, a trade school, and an orphan asylum; is an important wool market; and has breweries, machine works, foundries, and a large sugar factory. Pop. (1905) 17,161.

Gutenberg (gō'tėn-bĕrkh), **Henne,** or **Johann,** abt. 1400–68; German printer; b. Mainz; was the son of Frielo zum Gänsfleisch, a patrician, but took the name of his mother's family; removed, 1420, to Strassburg, where, 1436, he took several partners for the practice of wonderful secret arts invented by him. Of these arts, that of printing with movable types was the most important. Books printed before this time are all of the class called block books, printed from engraved plates of wood or metal. It is certain that Gutenberg and his associates had a printing press, with other apparatus for

practicing the new art, as early as 1438, but it is not known that any books were printed until after the formation of his partnership with Faust, or Fust, at Mainz, 1450. In 1455 the partnership was dissolved, and Peter Schöffer became Gutenberg's partner.

Guthrie (gŭth'rĭ), **Samuel,** 1782–1848; American chemist; b. Brimfield, Mass.; was one of the original discoverers of chloroform (1831), which he called a "spirituous solution of chloric ether."

Guthrie, Thomas, 1803–73; Scottish clergyman; b. Brechin; became pastor of the old Grayfriars Church in Edinburgh, 1837, and, 1840, of St. John's Church, becoming very popular with all classes, but especially with the poor; was prominent in the discussions which led to the disruption of the Church of Scotland, and coöperated with Chalmers, Candlish, and Cunningham in the organization of the Free Church; was active in establishing ragged schools and temperance reform. In 1864 he gave up the pastorate and became editor of the *Sunday Magazine.*

Guthrie, William, abt. 1708–70; Scottish author; b. Brechin; settled in London, and, 1746, was pensioned by the government; most important works are: "General History of England," "General History of Scotland," "General History of the World," and a "Geographical, Historical, and Commercial Grammar."

Guthrie, capital of Oklahoma and of Logan Co.; on the Cottonwood River; 31½ m. N. of Oklahoma City. On April 21, 1889, the day before the formal opening of the Oklahoma strip to settlement, the site of Guthrie was a bare prairie; on the 23d, 8,000 people were encamped in tents within its limits; in 1890, Guthrie won an exciting struggle with Oklahoma City for the location of the territorial capital; became the state capital when Oklahoma was admitted as a state, 1907; contains a U. S. penitentiary, Oklahoma Deaf Mute and Blind Asylum, St. Joseph's Academy, flour and planing mills, cotton-oil mills, ice factory, cotton gin, carriage and furniture factories, and other industries. Pop. (1907) 11,652.

Guts-muths (gŏts'mŏts), **Johann Christoph Friedrich,** 1759–1839; founder of the German system of gymnastics; b. Saxony; studied theology at Halle, and, 1786, became superintendent of gymnastics at the Schnepfenthal Institute; published schoolbooks and several works on gymnastics.

Gut'ta-per'cha. See RUB'BER.

Gutzkow (gŏts'kō), **Karl Ferdinand,** 1811–78; German novelist and writer; b. Berlin; studied philosophy and theology; became an acknowledged head of the Young Germany party. His "Wally, the Skeptic," novel, 1835, caused his imprisonment for three months, its tendency being considered atheistical and destructive to social order. He afterwards attained great popularity as a novelist, dramatist, and journalist; lived in various German cities, and from 1870 at Berlin. Noteworthy among his works are "The Philosophy of History" (written against Hegel); "Blasedow," a satirical tale; "Queue and Sword"; "Uriel Acosta," a tragedy; "The Magician of Rome," "Fritz Ellrodt," and other novels.

Guy (gī), **Thomas,** 1644–1724; founder of Guy's Hospital, Southwark, London, 1724; b. Horselydown; carried on business first as a bookseller; then as a financier; amassed a fortune of nearly £500,000; sat in Parliament, 1695–1707; built and furnished three wards in St. Thomas's Hospital; and founded and endowed different charitable institutions at Tamworth, his mother's birthplace. Nearly half of his fortune was bequeathed to Guy's Hospital.

Guyon (gē-ōn'), **Jeanne Marie Bouvières de la Mothe,** 1648–1717; French mystic; b. Montargis; married the wealthy Jacques de la Mothe-Guyon, a tyrannical and irreligious man, who died, 1676, leaving her free to foster that state of spiritual exaltation to which from infancy she had been inclined. Severe penances, untiring labors for the spiritual good of others, the abandonment of her property for the use of her three children, the guardianship of whom she surrendered, led her to a state in which she believed herself to be the bride of Christ, united in soul with God, having communications with heaven. She was, 1688–89, confined as a Quietist in the Visitation Convent of Paris; liberated through the agency of Mme. de Maintenon; for a time lived at the French court; was, 1695–1702, confined at Vincennes and in the Bastile. When released she retired to her daughter's house at Blois, where the rest of her life was spent in works of charity. She left many volumes containing hymns, letters on spiritual questions, and devotional treatises, some of a highly mystical character.

Guyot (gē-ō'), **Arnold Henry,** 1807–84; Swiss-American geographer; b. near Neuchâtel; in a tour of Switzerland, 1838, first discovered the laminated structure of the ice in glaciers, and showed that the motion of the glacier is due to the displacement of its molecules; subsequently investigated the distribution of erratic bowlders, to solve the mode of their transportation, traced them on both sides of the Central Alps, over a surface 300 m. long and 200 m. wide, and delineated eleven different regions of rocks. A topographical map of the subaqueous basin of the Lake of Neuchâtel was his next work. He was Prof. of History and Physical Geography in the Academy of Neuchâtel, 1839–48, then removed to the U. S.; resided for several years at Cambridge, Mass.

He was employed by the Smithsonian Institution to organize a system of meteorological observations, and prepared an extensive series of practical tables; was the first to determine the true height of Mt. Washington, 1851; of the Black Mountains of N. Carolina, 1856; and of the Green Mountains of Vermont, 1857; was appointed Prof. of Physical Geography in the College of New Jersey at Princeton, 1855; published "Earth and Man," "Directions for Meteorological Tables," "Creation,

or the Biblical Cosmogony in the Light of Modern Science," and a series of geographical text books; lectured on "The Unity of the System of Life," opposing the theory of evolution.

Guyton-Morveau (gē-tōń'-mōr-vō'), **Louis Bernard,** 1737–1816; French chemist; b. Dijon; devoted himself exclusively to the study of natural science, especially chemistry. At his suggestion chairs of chemistry, mineralogy, and medicine were erected at the Academy of Dijon, and he filled the first mentioned one till 1790. He contributed much to the erection of l'École Polytechnique in Paris, at which he became a professor; was director of the mint, 1800–14. His chief merits as a chemist are his discovery of the disinfecting qualities of chlorine, and his establishment of a new and simpler chemical terminology; but his experiments and researches were also of great influence in the manufacture of saltpeter, gunpowder, Prussian blue, etc., in the employment of cement for building under water, and in many other instances of practical application of chemical science; principal works, "Dictionnaire de Chimie" and "Methode d'une Nomenclature Chimique."

Guzel-Hissar (gō-zĕl'-hĭs-sär'). See AIDIN.

Guzerat (gūz-ĕ-rät'), or **Gujarat** (gōj-är-ät'), N. seaboard of the Bombay Presidency, British India; name is vaguely employed; includes the British districts of Surat, Broach, Kaira, Panch Mahal, and Ahmedabad, and also the native states of Baroda and a dozen or more others; sometimes also includes the peninsula of Kathiawar, with its 180 petty states; defined thus it has an area of over 40,000 sq. m.; has given its name to one of the great languages of Bombay, the Gujarathi. Pop. (1901) 19,048.

Guzman (gōth-män'), **Ruy Diaz de,** b. 1544; first historian of Paraguay; b. in that country; his father was one of the followers of Cabeza de Vaca, 1544, and the son early served in the numerous Indian wars; later was military governor of Guayra. His "História Argentina del Descubrimiento, Población y Conquista de las Provincias del Rio de la Plata" was finished, 1612, but remained in manuscript until 1836, when it was published in the Angelis collection; date and place of his death unknown.

Gwalior (gwä'lē-awr), capital of the state of Gwalior, India; on the Subanrika, an affluent of the Jumna. In the midst of the city rises a rock, perpendicular, 300 ft. high, 1½ m. long, and 300 yd. broad, which was used as a fortress for more than one thousand years. At the foot of the rock stretches the city, built in the ancient Hindoo style, and containing some of the most stupendous specimens of Hindoo palace architecture, dating back to the fifteenth and sixteenth centuries. It also contains some very interesting temples of Jain origin. The most remarkable Jain remains, however, are the caves and rock-cut sculptures in the rock on which the fortress is built. Pop. (1901) 89,154.

Gwinnett', Button, abt. 1732–77; American patriot and signer of the Declaration of Independence; b. England; emigrated to America, 1770; purchased a tract of land in Georgia; was elected to Congress, 1776; became president of the Provincial Council of Georgia, 1777; was mortally wounded in a duel with Gen. McIntosh.

Gwynn (gwĭn), **Nell,** abt. 1650–abt. 1690; English actress; b. London, in the most abject poverty; sold oranges in the taverns, and sang and danced for money, and in her sixteenth year went on the stage, where she made a great hit in humorous and wanton rôles; became the mistress of Lord Buckhurst, and, 1669, of Charles II; 1671, was appointed a lady of the privy chamber to Queen Catharine, and received the name of Madam Ellen; helped her old friends among the actors and poets; was the first to propose the erection of Chelsea Hospital for disabled soldiers; and was generally believed to have exerted herself in support of the Protestant cause at court; bore two sons to the king, of whom one died early, and the other was created Duke of St. Albans; after the death of Charles II she lived in retirement.

Gy'aros, one of the Cyclades; now uninhabited and employed as a sheep pasture; lies SW. of Andros; was anciently proverbial for the poverty of its people; and was a most dreaded place of banishment for the Romans; present name, Giura, or Giurna.

Gyges (gī'jēs), d. 678 B.C.; favorite officer of Candaules, King of Lydia; expelled the Assyrian dynasty of the Sandonidæ (Heraclidæ) from Lydia; founded the dynasty of the Mermnadæ, the last sovereign of which was the ever-famous Crœsus; murdered Candaules, and became King of Lydia abt. 716 B.C. The Delphic oracle confirmed him in his new position, and in return he sent to Delphi an offering of immense value. The story that Gyges came into possession of the throne by means of an enchanted ring is told by Plato, and the ring of Gyges was with the ancient Greeks a symbol of extraordinary good luck.

Gymnasium (jĭm-nā'zĭ-ŭm), among the Greeks a place for athletic exercises. In its simplest form the gymnasium was a vast building with a colonnade around the four interior sides. Appropriate places were provided for running, jumping, wrestling, boxing, spear and discus casting, for warm and cold baths, for undressing, for anointing the body with oil and besprinkling it with sand. In addition to this, space had to be provided for the accommodation of the people, who were fond of witnessing the athletic exercises of the young. By degrees the gymnasium became a place to which people went for amusement and mental refreshment, and so the grounds of the gymnasium were provided with promenades, both covered and uncovered, with gardens and resting places of various kinds in which men might lounge, converse, study, or receive oral instruction. In classical times there were three gymnasia in Athens—the Academia, the Lycæum, and the Cynosarges

—but in later times there were more. Ancient gymnasia have been discovered by excavations at Olympia, Pergamon, Hierapolis, Aphrodisias, Alexandria Troas, Assos, and Delos. The gymnasium finally became merely a school. But except in Germany and some other European countries the name has reverted to its original sense. In Germany the gymnasia are the schools where young men are fitted for the universities. But those who intend to follow a technical profession, such as architecture, engineering, etc., study at the *Realschulen* and not at the *Gymnasia*, and after having passed through the Realschule they enter the Polytechnicum for their professional education. See GYMNASTICS.

Gymnas'tics and Phys'ical Cul'ture, athletic or disciplinary exercises, designed to promote strength, including running, leaping, the use of parallel bars, and the lifting of weights, etc. Among the early Greeks practice in the use of weapons was an essential part of gymnastic training. Calisthenics are light gymnastics designed to impart grace of movement as well as physical strength. The apparatus used chiefly consists of a light wooden staff, about 4 ft. long, a pair of light dumb-bells, chest weights, and parallel bars. Marching and other movements often are performed to the sound of music. In ancient Greece the ability to wield effectively the sword and spear, javelin and bow, to run, climb, and endure fatigue transcended in practical value all other accomplishments, so it is not surprising to find that the education of the youth consisted essentially of this training. Later the ideals of the Greeks became broader, and we have the conscious training for grace and symmetry.

An English physician, Thomas Fuller (1654–1734), advocated a return to the Greek methods. Montaigne and Locke made strenuous efforts in behalf of a broad education to include physical training, but it remained for Rousseau by his "Émile," 1762, to rouse public interest in the movement. In Germany many attempts were made to systematize physical culture, but the movement had not become general till Jahn, an accomplished gymnast, conceived the idea of nationalizing Germany by educating the youth, and rousing in them the spirit of patriotism. To this end he organized societies for systematic instruction and training in gymnastics and athletics. He also invented many pieces of apparatus, such as the parallel and horizontal bars, and greatly enriched systematic gymnastics by adding new and varied exercises. Jahn is indeed the father of modern gymnastics. After the German war for independence the gymnasiums flourished till 1819, when they were suppressed for political reasons, but revived in 1844. The spread of gymnastics in the U. S. and other countries at this time was due to exiled teachers from Germany. A characteristic of the German system is that it grows spontaneously, because it embodies the play instinct, and rouses all the stimulating emotions of play, at the same time giving the needed exercise.

Ling, the founder of the Swedish system, worked out a system of movements from a different standpoint. He analyzed movements into elements, each performed by as few muscles as possible, thus claiming to localize the will and train coördination. After drilling on these elementary movements for "purity" he combined them into groups forming complete exercises. The resemblance to the a-b-c method of learning to read is striking. Ling's aims were hygienic, educational, therapeutic, and military, and he worked out what must be regarded as the most definite system of physical training that has yet been evolved. Since 1889 a strong effort has been made to introduce the unmodified Swedish system generally into the schools of the U. S. England's contribution to physical training has been chiefly the development of sports and games, such as archery, football, cricket, tennis, boating, hare and hounds, handball, etc. These furnish undoubtedly as complete and thorough body development as was gotten in the primitive days.

Between 1821 and 1879 several of the schools and colleges in the U. S. established gymnasiums, chiefly influenced by the Germans. The building of the Hemenway gymnasium in 1879 by Harvard marks the beginning of an era in gymnastics in the U. S. The Harvard system of developing appliances started in 1869, when Dr. Sargent took charge of the Bowdoin College gymnasium as student instructor. At this time the equipment of a gymnasium consisted of certain German apparatus, parallel bars, horizontal bar, trapeze, etc., which were used by a few of the students only. The mass of the students were not experts in these exercises, and did little or nothing in the way of gymnastics. It was seen that attitudes necessitated by occupations became fixed habits in ratio to the length of time they were held uncorrected by other attitudes; also that in individuals possessing unequal muscular development faulty attitudes were often the result of the apparent shortening of stronger muscles, the increased tonicity of these muscles exerting a constant pull. Thus the necessity of supplementing the development due to occupation was clearly seen, and also the rational method of effecting this by the local development of the relaxed weaker muscles.

To do this economically and definitely various machines were devised. The first of these was the adjustable chest weight (1869), which was followed by other "developing appliances" to furnish means selectively to build up weak and relaxed muscles. Such developing appliances are the high and low pulleys, leg machines, wrist and ankle machines, chest expanders and developers, quarter circle, abdominal machine, etc., forty in number, devised chiefly between 1869–79. The movements are practically similar to the Swedish, but differ essentially in that they are all made against external resistance which can be adjusted to strength, hence coördination is trained to an economical expenditure of energy in overcoming such resistance. This is an important distinction which serves as one basis for the classification of movements, for in slow, free movements, such as the Swedish, much of the

resistance comes from the contraction of antagonistic muscles. The individual's need may be made the basis of work, and a clear prescription given specifically directing his work toward the attainment of his ideal form and condition, not only from a physical standpoint, but in relation to his intellectual activity. This makes it important to have a trained physician study the individual and decide the problems presented in each case.

The measurements to record the progress of an individual while in training were at first chiefly of the height, weight, upper arm, forearm, chest, thigh, and calf, and were made with no idea of collecting data, but for immediate limited use; but when the value of the measurements of a large number of individuals of school and college age was realized as contributing to a study of the rate of growth, influences affecting growth, males as compared with females, different nationalities, etc., to the more obvious measurements were added bone lengths, joint circumferences, and girths of important parts of the head, trunk, and limbs, together with certain strength tests, as grip, number of times pull-up and push-up, strength of back, leg, and chest muscles, of expiratory muscles, capacity of lungs, and a record of color of eyes and hair, history of diseases and habits, and nationality of parents and grandparents.

Attention is now being directed to the necessity for tests which shall show the condition of an individual as a vital unit, not merely as a mass of muscle and bone; tests of quickness, accuracy, endurance of mental and muscular power, of voluntary muscular control, delicacy of adjustment of automatic control, of circulation general and local, of respiration, response of circulation and respiration to exercise, fatigue, tone of nervous and muscular systems, etc.

Gymnosophists (jĭm-nŏs'ō-fĭsts), sect of ancient Indian philosophers, so called by the Greeks because they went naked, or nearly so. They lived in the woods on wild products, courted death, and had a great reputation for wisdom and learning. Their most prominent tenet was the doctrine of transmigration.

Gymnosperms (jĭm'nō-spêrms), class of flowering plants characterized by having the seeds borne on the upper surface of an open leaf or scale, or on the margins of an open leaf, or even in open cup-shaped structures on modified branches. This fact, that the seeds are not inclosed in a folded leaf (pistil), but are naked, has given these plants their name. In fertilization the pollen falls directly upon the ovule, and, there germinating, sends its tube into its tissue and finally to its egg cells. They are regarded as the lowest of the flowering plants. Three orders are usually recognized, *viz.*, the Cycads, the Conifers, and the Joint-firs.

Gyp'sies, vagabond people found in most parts of the world. Other names given to them are: Zingari in Italy, Gitanos in Spain, Zigeuner in Germany, Cziganyok in Hungary, Tzigani in Slavic countries, Tchinganeh in Turkey, and Bohémiens in France (where they were first known as wanderers from Bohemia). They call themselves Kale or Mellele (the black), Mellelitchel (black people), Sinde or Sinte (probably meaning people from India), but more commonly by some gypsy word signifying "people," as Manush, Rom, feminine Romni. Büttner, Pallas, and others consider them to have come from India, whence they were driven by the ravages of Tamerlane (1398), and where they belonged to the Soodra caste, or to the Pariahs. There are many roving tribes in India and Persia which resemble the gypsies. Organized bands of gypsies first appeared in the Danubian provinces, 1417. They numbered about 14,000 in Italy, 1442. In 1427 there arrived in Paris 120 strangers, claiming to be Christians of Lower Egypt who had been expelled by the Saracens. They said they had last come from Bohemia. They professed the gifts of fortune telling and palmistry, and were great thieves. They were expelled from Paris, but continued to wander in France, and other bands succeeded them.

They appeared in Spain, 1447, in England, 1506, and in Sweden, 1514. Severe laws were passed against them; Spain exiled them, 1492; in England, Henry VIII issued, 1530, a proclamation, renewed by Elizabeth, which made their stay in England for over a month a capital felony; the Scottish kings pursued a different policy, and seem to have given them a sort of protection; Italy, Denmark, Sweden, the Netherlands, and Germany took measures against them; Maria Theresa, 1768, ordered that the bands in her dominions should be gathered in settled habitations, and called *Neubauern*, new peasants. At present the gypsies of Hungary, Transylvania, and Roumania lead a comparatively settled life. In Transylvania they are under the rule of a waywode of their own race. They are numerous in Russia, Turkey, and Spain. A considerable number are in Norway; in France there are few or none; in England they have decreased in recent years. The whole number of gypsies in Europe is supposed to be from 500,000 to 700,000. It is doubtful if any bands of genuine gypsies are to be found in the U. S., though their appearance in small numbers in some of the N. states in summer is occasionally reported. The language of the gypsies, though everywhere preserving forms of an Indian origin, differs in various countries, from the language of each of which they borrow a considerable stock of words.

Gyp'sum, natural crystalline sulphate of lime. The translucent varieties are known as silenite (from selene, the "moon," in allusion to the characteristic soft luster); the ordinary massive forms and opaque crystals as gypsum; the finer granular subtranslucent massive kinds, as alabaster, and fibrous varieties, as satin spar. In hardness gypsum varies from 1.5 to 2.0, and the specific gravity of pure crystals is from 2.314 to 2.328. Heated, this mineral gives off its contained water, and becoming opaque falls to a powder, which has the power, if moistened, of rapidly "setting" or assuming again the solid form. Upon

this property depends the most extensive application of this mineral in the arts, as plaster-of-Paris is made from it by heating and subsequently grinding it to a fine powder. Extensive deposits of gypsum are worked in England, France, and other countries of Europe. In the U. S. gypsum is obtained from a great number of localities, more or less extensive beds having been met with in Virginia, Tennessee, Michigan, etc., and in imitative forms of scrolls, vines, flowers, shrubbery, etc., it constitutes one of the wonders of the Mammoth Cave, Kentucky.

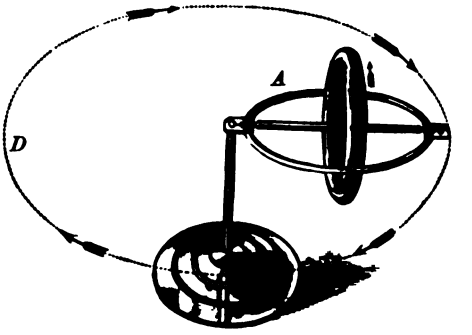
Gyp'sy Moth, European moth (*Ocneria* or *Liparis dispar*, in the U. S. sometimes called *Porthetria dispar*) belonging to the family *Noctuidæ*. The eggs are laid in clusters of 400 or 500, usually in more or less concealed

CATERPILLAR, CHRYSALIS, AND BUTTERFLY, MALE AND FEMALE, OF THE GYPSY MOTH.

places. The caterpillar, or larva, feeding on leaves, etc., rapidly grows to full size, when it is about an inch and a quarter in length. A few specimens were introduced into Massachusetts abt. 1868, to try the experiment of utilizing their silk. Some escaped, and ten years later became such a serious pest that the State of Massachusetts began war on them by an appropriation to be used in their extermination.

Gyrfalcon (jĕr'fâ-k'n). See FALCON.

Gyroscope (jī'rō-skōp), a name applied to various instruments illustrating the phenomena of rotation. The most common form consists essentially of a disk revolving on pivots within a ring, having on the line of prolongation of its axis, on one side, a bar with a conical depression beneath to receive the hard, smooth point of an upright support. When the disk is made to revolve with sufficient velocity, and supported as shown in the figure, it will not fall, but the system will revolve around the point, in the relative direction shown by the arrows. Not only does the rotating disk (with its ring) not fall, as



GYROSCOPE.

would happen were there no rotation, but, preserving the angular elevation of its axis, it takes up a slow horizontal motion (gyration) in the reverse direction to that in which, by rotating, the upper periphery of the disk is moving—*e.g.*, the disk in the figure revolves as marked by the arrow near its top; its gyration is as the arrows along the indicated horizontal circle D. If the direction of disk rotation be reversed, so will be that of the gyration. It will be found, also, that the rate of gyration is the same for all elevations of the axle, and that the greater the rotating velocity of A the slower will be the gyration—that as rotatory velocity is lost, the gyratory velocity increases simultaneously, with a gradual drooping of the outer extremity of the axis, which, with continually accelerated gyratory velocity, falls in a descending spiral (or helix). When the wheel, rotating with great velocity, is placed on the point of support with axis considerably elevated, the axis, instead of falling (as it gyrates), will rise.

Louis Brennan, a British engineer, has recently successfully applied the principle of the gyroscope to railroading. By means of two gyroscopes revolving in opposite directions at a high rate of speed he kept a small car, having a single row of wheels, in perfect balance upon a single track. High speed and perfect balance were maintained over an irregular track, with curves and grades. Dr. Otto Schlick has, during the past few years, been perfecting the application of the gyroscope to the management of vessels with the object of eliminating the lateral or rolling movement. The principle of the gyroscope has also been successfully used to correct magnetic compasses.

H

H, eighth letter in the Latin alphabet, and in others derived directly from it, as English, French, German, and Italian; was also the eighth letter in the original Greek alphabet. Ordinarily it is a simple aspiration or rough breathing. In some words it is quite silent. With *t* it forms two digraphs, *th* soft and hard. With *c* it forms three such digraphs, and with *g* one; *gh* being, however, in English ordinarily a *g* pronounced as if hard, when from position, without the *h*, it would be soft. H in chemistry stands for hydrogen. See ABBREVIATIONS.

H (hä), in music, the German name for B natural, B flat being called B.

Haarlem (här'lĕm), city of the Netherlands, province of N. Holland; on the Spaarne; 10 m. W. of Amsterdam; has several interesting buildings, as, for instance, St. Bavon's Kerk, with its world-famous organ; many collections of consequence to science and art, good educational institutions; and considerable manufactures of velvet, silk, linen, carpets, and lace; is the center of the trade in flowers, especially hyacinths, bulbs and flower seeds, which is a specialty of Dutch enterprise, and which here has assumed astonishing dimensions. Close by is the beautiful Haarlem Forest, with the royal palace, Welgeleque, a much frequented summer resort. There was formerly, contiguous to the city, a great body of water called Haarlem Lake. In the early part of the nineteenth century it had an area of 45,000 acres, and every storm caused further encroachment on adjacent territory. In 1839 the Dutch Govt. began the work of draining the lake, and it was finally pumped dry by means of enormous engines, in 1852. The city has played an important part in the history of the Netherlands, and particularly during the revolt against Spain, when its inhabitants sustained a seven months' siege (1572–73) against the Spanish commanded by Don Frederick, Alva's son. After a heroic defense it was forced to capitulate, and the conquerors, despite their promise of mercy, took a barbarous vengeance on the inhabitants. It was not till 1577 that it was regained by the Dutch under the Prince of Orange. Pop. (1906) 69,701.

Habak'kuk, one of the twelve minor prophets of whose birth or death we know neither the time nor place with certainty. His prophecy, which forms one of the books of the Old Testament, is variously dated by different scholars from abt. 630–590 B.C. It relates chiefly to the threatened invasions of Judea by the Chaldeans. The style is highly poetical, and the ode or prayer of the third chapter is probably unrivalled not only for splendor of diction and subject, but for simplicity, sublimity, and power.

Haba'na. See HAVANA.

Ha'beas Cor'pus, ancient English writ, used for a variety of purposes from the remotest time. It is addressed to a sheriff or other officer, and commands him to "have the body" of the person named at a certain place and time. The characterizing Latin words of this writ were *ut habeas corpus*. The chief purpose for which it was used was to recover freedom wrongfully taken away. In Magna Charta it is said that "no man shall be taken or imprisoned but by the lawful judgment of his peers, or by the law of the land." This clause became operative only by means of the habeas corpus. The writ was issuable from the king's bench; and it was used to bring the prisoner before the court, whose duty it was to order his immediate discharge if he were not restrained according to law; but it was evaded, and a declaration similar to that of Magna Charta was contained in the Petition of Right, passed 1628. Personal liberty, however, continued to be violated until 1679, when the habeas corpus act was enacted.

The English statute has been copied in the U. S. without essential change. The Constitution of the U. S. provides that "the privileges of the writ of habeas corpus shall not be suspended, unless when in case of rebellion or invasion the public safety may require it." The Federal courts have authority to issue the writ in cases where persons are confined by or under pretense of Federal authority, and also where it may be necessary to the enforcement of Federal jurisdiction. A declaration of martial law operates as a suspension of the act of habeas corpus, since the functions of the civil courts are in abeyance till order is restored by military rule.

There are several writs passing by this name with words added, more specifically to denote their application, such as: (1) *Habeas corpus ad faciendum et recipiendum*; (2) *ad prosequendum*; (3) *ad respondendum*; (4) *ad satisfaciendum*; (5) *ad subjiciendum*; (6) *ad testificandum*. The office of the first of these is to remove, on the application of a defendant, a cause from an inferior to a superior court; of the second, to remove a prisoner to be tried within the jurisdiction where an alleged act was committed; of the third, on the part of a suitor, to remove a cause of action to a higher court; of the fourth, after judgment, to charge a person in a superior court with process of execution; of the fifth, to bring up a person detained by another, with a view of inquiring into the cause of detention; and of the sixth, to bring a witness who is in custody at the time of a trial into court. Of these the last two are much the most important. The fifth, as above enumerated, is the great writ of *habeas corpus* of so much importance to the liberty of the individual both in Great Britain and in the U. S. See MARTIAL LAW.

Haber'geon, in the Middle Ages, a coat of chain mail, a hauberk; in later times, a piece of plate armor, the exact nature of which is uncertain.

Hab'it, constitution or state of mind or body which disposes one to certain acts or condi-

tions, mental or physical. A habit is of more fixed character than a disposition, but is generically the same. There are habits intellectual and moral, acquired and inherited, active and passive. Habits are originally the results of voluntary acts, but the control of them may become impossible to the will.

Physiologically, habit represents a modification and coördination of structure, so that each performance of the function becomes easier and the desired end is attained with a diminished expenditure of energy. The acquisition of complex movements of skill, such as are necessary in piano playing, illustrates the manner in which simple organic habits of muscular movement and nervous impulse may be combined and executed almost unconsciously to produce a complex result under the guidance of mental impulses. As conscious attention is one of the most exhausting functions, from the nervous energy which it requires, the unconscious performance of acts or mental processes, as the result of training and habit, adds greatly to mental and personal efficiency.

A wise and skillful formation of habits is of the greatest moral and intellectual advantage, while habits injudiciously formed are destructive of mind, character, body, and estate. The question of habit is intimately connected with that of the association of ideas, heredity, and the will.

Hack'berry, Sug'arberry, or **Net'tle Tree,** N. American tree of considerable height and much beauty, but variable in its mode of growth

HACKBERRY.

and botanical characters. Its wood is tough, but is not much used in the arts. It makes good charcoal, and when young is used for barrel hoops, and sometimes called hoop ash.

Häck'el. See HAECKEL.

Hack'ett, James Henry, 1800–71; American actor; b. New York; made his first appearance at the Park Theater, New York, 1826; went to England the same year, and also made successful professional visits there, 1832, 1840, 1845, and 1851. In 1829–30 he was associated in the management of the Bowery and Chatham theaters in New York; 1837, managed the National Theater; 1849, was lessee and manager of the Astor Place Opera House; 1854, engaged Grisi and Mario, and gave Italian operas throughout the U. S. His *Falstaff* was thought to be his best character, and in it he made his last appearance in New York, December 25, 1869; published "Notes, Criticisms, and Correspondence upon Shakespeare's Plays and Actors."

Hackländer (häk'lĕn-dĕr), Friedrich Wilhelm von, 1816–77; German novelist and comedy writer; b. Burtscheid, Prussia; traveled extensively in Italy, France, Russia, and the Far East; wrote "Pictures of Soldier Life," "Daguerreotypes," "Pilgrimage to Mecca," "Trade and Traffic," the comedies "Secret Agent," "Magnetic Cures," and "Guilty"; founded, 1857, the illustrated magazine, *Over Land and Sea.*

Hac'kle, Hatch'el, or **Hetch'el,** comb with long steel teeth by means of which the tow is removed from flax, hemp, or jute, and the fibers fitted for spinning or other uses by straightening and laying them parallel to each other.

Hack'matack, Tam'arack, or **Amer'ican Larch,** forest tree of the U. S., growing frequently in wet places, and attaining a large

HACKMATACK.

size, except in the far N.; is one of the few native coniferous trees whose leaves fall off in winter; wood is of excellent quality; used for poles and rafters, and, in shipbuilding, for ship's knees, top timbers, and spars; is

very durable in contact with the soil, and is prized for posts, pump logs, etc.; is also a good ornamental tree, especially when young.

Hadas'sah. See ESTHER.

Had'dock, fish of the cod family, captured in large quantities on both sides of the Atlantic for food; is generally eaten fresh, but

HADDOCK.

is sometimes smoked or salted and dried; resembles the cod, but is easily distinguished by the black line along its side, that of the cod being white; sometimes weighs 15 lb.

Hade. See FAULT.

Ha'den, Sir Francis Seymour, 1818– ; English etcher; b. London; became a physician and member of the Royal College of Surgeons; began etching as a rest from professional practice; founder and president of the Royal Society of Painter Etchers; won the Grand Prix, Paris, 1899 and 1900; writings include works on art and on natural and sanitary science, "Protest Against Cremation," "About Etching," "The Etched Work of Rembrandt," etc.; knighted, 1894.

Ha'des, in the Homeric writings, is used as the name of the god of the lower or invisible world, and is the equivalent of Pluto. In later Greek writings it is used to designate the place of departed spirits. The corresponding Hebrew words is *Sheol,* which in our English version is sometimes rendered "grave," sometimes "pit," and sometimes "hell." *Hades* is almost always employed in the Septuagint in translating *Sheol.* In the text used by the King James's translators it occurs eleven times, and was rendered "hell" in every place except 1 Cor. xv. 55. In the text adopted by the revisers (1881) it occurs ten times (1 Cor. xv. 55 dropping out), and is uniformly rendered simply "Hades." See ELYSIUM; TARTARUS.

Hadji (hăj'ĭ), Arabic word signifying pilgrim, *hadj* being the term used by Mohammedans for the sacred pilgrimage to Mecca. Every Mohammedan is bound once in his life to visit the holy city Mecca, and he who has made the pilgrimage afterwards bears the title Hadji prefixed to his name; as Hadji Ibrahim, Hadji Mohammed.

Hadley, James, 1821–72; American linguist; b. Fairfield, N. Y.; 1848, became assistant and, 1851, full Prof. of Greek in Yale; was familiar with Sanskrit, Hebrew, Arabic, Greek, Latin, Armenian, Gothic, and many modern languages; wrote the "History of the English Language" in the introduction to Webster's Dictionary, and was the author of a "Greek Grammar," "Elements of the Greek Language," "Lectures on Roman Law," and "Essays Philological and Critical," edited by Prof. W. D. Whitney.

Hadley, John, 1682–1744; English astronomer; became a fellow of the Royal Society in London, 1717, and published in the "Transactions" of the Society for 1731 an account of an invention he had made with respect to the quadrant. Soon afterwards, however, Thomas Godfrey, of Philadelphia, laid before the society a similar invention. The case was investigated, both parties were declared entitled to the honor of invention, and each of them received a prize of £200.

Hadramaut (hä-drä-măt'), the *Adramitæ* of Strabor, SW. portion of Arabia Felix; in a larger sense includes nearly all that part of Arabia S. and SE. of the central desert of the peninsula. Its people are of many tribes, subject to various local sultans, and as a rule are not nomadic.

Ha'drian, or **A'drian,** or, more fully, PUBLIUS ÆLIUS HADRIANUS, 76–138 A.D.; Roman emperor. His mother was the aunt of Trajan, and his wife, Julia Sabina, was the granddaughter of Trajan's sister; and through this connection he rose rapidly to various high offices at Rome, being quæstor, 101; tribune of the people, 105; prætor, 107; and *legatus prætorius* of Lower Pannonia, 108. When Trajan died, Hadrian was in command of the armies of the East, and was proclaimed emperor at Antioch, August 11, 117. His policy was pacific. He renounced the conquests made by Trajan E. of the Euphrates, and concluded a treaty with the Parthians. In 119 he began a tour through the Roman Empire, visited Gaul and Germany, and in Britain built a defensive rampart of earth about 60 m. long, from Solway Frith to the North Sea, near the mouth of the Tyne. He then traveled through Gaul, Spain, Mauritania, Egypt, and W. Asia, and finally paused at Athens for three years. The Jews having revolted, 131, he desolated Judea and expelled them from Jerusalem, planting a Roman colony there. Toward the close of his life he occupied his celebrated villa near Tibur, and became suspicious and cruel. Hadrian wrote and spoke with eloquence, and left numerous works in prose and verse, all of which are lost except a few epigrams. Antoninus Pius succeeded him.

Hadrian's Tomb, a grandiose monument commenced by Hadrian in Rome, on the W. bank of the Tiber, abt. 130 A.D., and completed by his successor, Antoninus Pius. Its enormous round tower, though shorn of its former elaborate accessories, still stands, and is known as the Castle of Saint Angelo. In the Middle Ages it was used as a fortress and a prison. It is 220 ft. in diameter, 72 ft. high, and rests on a square base whose sides are abt. 100 yds. long. It was originally covered with marble and probably surmounted by a pyramid.

Hadrian's Wall, an ancient line of defenses extending from the Solway to the Tyne in the N. of England. It consisted originally of a

stone wall, three parallel earthen walls, two ditches or fossæ, and numerous castles and turrets connected by a military road. It bears evident marks of Roman workmanship and is commonly assigned to the time of the Emperor Hadrian.

Hadrosaurus (hā-drō-sâ'rŭs), gigantic extinct dinosaurian reptile, living on the shores and in the forests of the cretaceous epoch; abundant in the region of New Jersey, where its

HADROSAURUS.

remains have been found. It attained a length of 30 ft.; the fore limbs were less than half the size of the hind, but the tail was of immense strength. It was evidently a land animal, and its grinding teeth indicate the vegetable character of its food.

Haeckel, or **Häckel** (hĕk'ĕl), **Ernst Heinrich,** 1834– ; German naturalist; b. Potsdam; Prof. of Zoölogy at Univ. of Jena after 1865; chief representative of radical naturalistic evolution in Germany; author of "Natural History of Creation," "The Origin of the Human Race," "Life in the Deep Seas," "The History of Man's Development," "Popular Lectures on Evolution," "The Riddle of the Universe," etc.

Hafiz (hä'fĭz), *takhallus* or *nom de plume* of SHAMS UD-DIN MUHAMMAD; Persian lyrical poet; b. at Shiraz in the beginning of the fourteenth century. The historical notices of his life are scanty and the known facts of his biography are confined chiefly to a few unimportant incidents. From an allusion in Hafiz's writings it is inferred that he was happily married, as one of his odes contains a lament for the death of a beloved wife. He died in the year A.D. 1388 (A.H. 791). The poems of Hafiz consist for the most part of *ghazals*—that is to say, of short odes or sonnets, consisting of from five to fifteen verses each, with the same rhyme throughout, and having the poet's *nom de plume* woven into the last couplet as a signature. Hafiz is justly esteemed as the greatest lyrical poet Persia has produced. His language is singularly idiomatic and beautiful; his verse is exquisitely smooth and flowing, and his thoughts and allusions are eminently national. To a person who desires to study the thoughts, manners, or language of Persia, Hafiz is the best guide.

Hagar (hā'gär), Egyptian servant belonging to Sarah, who bore Ishmael to Abraham, and was driven into the wilderness. The Arabs claim descent from her son, and venerate her as Abraham's lawful wife.

Hag'don, or **Hag'den,** common name among the New England fishermen for the greater shearwater, a bird abundant in the N. Atlantic off the shores of Europe and the U. S.

Hagedorn (hä'gĕh-dōrn), **Friedrich von,** 1708–55; German poet; b. Hamburg; studied jurisprudence at Jena; was secretary to the Danish minister in London, 1729–31, and afterwards to the "English Court," a trade association in Hamburg. He wrote poems of various descriptions (sentimental, satirical, didactic, moral, etc.) and in various forms (odes, epigrams, fables, etc.), and is called the father of the German *Lieder* (songs). He represents a French influence in German literature, and was much admired in his time.

Hagenau ((hä'gē-now), town of Germany; province of Lower Alsace; on the Moder; was founded by Frederick Barbarossa, 1164, and was formerly a fortress which played a conspicuous part in the wars between France and Austria; belonged to France, 1648–1871; has manufactures of porcelain, stoves, and cotton and woolen fabrics. Pop. (1900) 17,968.

Hagenbach (hä'gĕn-bäkh), **Karl Rudolf,** 1801–74; German theologian; b. Basel; Prof. of Theology at Basel from 1828 till shortly before his death; was a firm Protestant, but a man of catholic temper; most important publications: "History of the Church in the Eighteenth and Nineteenth Centuries," "History of Doctrines," and "History of the Reformation."

Hagga'da, part of Jewish tradition consisting of stories, legends, etc., giving a homiletical exposition of the entire Bible, as complementary to the Halacha, which gives the legal exposition and is limited chiefly to the Pentateuch. The two make up the Midrash.

Haggai (hăg'gā-ĭ), one of the twelve minor prophets. His prophecy, which forms one of the books of the Old Testament, was delivered about 520 B.C., after the return of the Jews to their own land. It is chiefly occupied with reproofs and exhortations respecting the building of the second temple.

Hagiographa (hā-jĭ-ŏg'rā-fā). See BIBLE.

Hague (hāg), or **The Hague,** city of the Netherlands; capital of the province of S. Holland; residence of the royal family; seat of the States-General and of the International Court of Arbitration; meeting place of the First International Peace Congress, called by the Czar of Russia, 1899, and the Second Congress, 1907; especially noted for the historical events that occurred here. It is a very handsome city, with beautiful parks and broad streets, many of which are intersected by canals, with rows of linden trees planted on both sides, and spanned by fine bridges. Among its most notable buildings are the Church of St. James, built 1308, and famous for its hexagonal tower, with a chime of bells; the picture gallery, containing large collections of the most excellent works of the Dutch school of painting; the Gevangenpoort, the Binnenhof, and the Buitenhof, old places of striking architecture. There is being erected a Temple of Peace, to be the permanent home of the International Court of Arbitration, for which Andrew Carnegie gave $1,500,000, with an additional $500,000 for a library. The triple alliance between England, Sweden, and the Netherlands was concluded here, 1668; the famous Treaty of Ryswick was signed in the castle of that name, near the city, 1697; and Austria, Spain, and Savoy signed peace here, 1717. Pop. (1906) 248,995.

Hague Tribu'nal, popular designation of the Permanent International Court of Arbitration, established by the first International Peace Congress, held at The Hague, 1899, for the adjudication of disputes between member-nations without recourse to war. Each party chooses two arbitrators from a list of international jurists previously designated for six years as available. These arbitrators then choose an umpire. Under the provisions of its constitution its members are considered as being ready at any time to consider a dispute that may be referred to the court for settlement by consent of all interested parties. The court is composed of representatives of all the nations that have recognized it, which embrace all the maritime powers and, excepting a few small states, nearly all others. The first appeal to The Hague Tribunal was made by the U. S. and Mexico, in 1902, the question at issue being the Pius Fund Claims.

Hahnemann (hä'nĕh-män), **Samuel Christian Friedrich,** 1775–1843; founder of the homœopathic system of medicine; b. Meissen, Saxony; took his degree of M.D. at Erlangen, 1779, and, 1785, settled in Dresden. A distrust of the received system of therapeutics caused him to abandon practice, 1789, when he went to Leipzig and engaged in translating English and French medical works. In 1790, while translating Cullen's "Materia Medica," he was struck with the contradictory properties ascribed to Peruvian bark, and the various explanations given of its operation in intermittent fever. A trial on himself of several powerful doses resulted in symptoms analogous to those of intermittent fever. That a drug should produce on man in health the symptoms it was expected to cure in a sick man suggested to him the law, *Similia similibus curantur* ("Like cures like"), which is the groundwork of the homœopathic system.

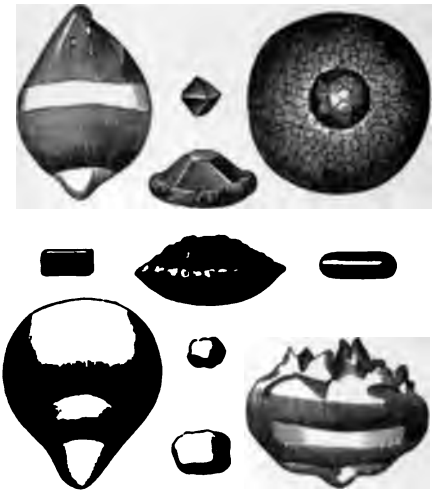
Similar results having been obtained by experimenting with various drugs, he applied the new law with success to the treatment of the patients in the insane asylum at Georgenthal, near Gotha, of which the Duke of Saxe-Gotha had given him the charge. In 1796 he made his first public expositon of the *similia similibus* principle. His suggestions were received with indifference or ridicule, but during the next fifteen years he published several works, including his "Organon der Rationellen Heilkunde" (1810), in which homœopathy first received its distinctive name, and was reduced to a system. He again settled in Leipzig, and acquired an extensive practice. During the prevalence of a malignant form of typhus, 1813, the patients were divided among the physicians, and of the seventy-three allotted to Hahnemann all recovered except one old man. An old law forbidding a physician to dispense his own medicines having been revived against him, he removed, 1820, to Köthen, and, 1835, settled in Paris, where he acquired an enormous reputation and practice, and on the occasion of the sixtieth jubilee of his doctorate received deputations from all parts of Europe, from hospitals, and from princely houses, congratulating him on the unprecedented and rapid spread of his methods.

Haidarabad (hī-dä-rä-bäd'), or **Ni'zam's Domin'ions,** native state in the Deccan, India; bounded NE. by the Central Provinces, SE. by the Madras Presidency, W. by the Bombay Presidency, and N. chiefly by Berar; area, 82,698 sq. m.; pop. (1901) 11,141,142; capital, Haidarabad; pop. (1901) 448,466. The city was founded 1589; is surrounded by a wall, and is celebrated for its mosques and for the fanaticism of its Mohammedan inhabitants. The palace of the Nizam is here, a vast waste of edifices without character. Outside the city is the residence of the British political agency, one of the finest European constructions in India; 5 m. N. are the British cantonments of Sekanderabad, and 7 m. W. is the celebrated fortress of Golconda.

Haidarabad, capital of the province of Sind, Bombay Presidency, British India; 3 m. from the Indus; is believed to occupy the site of the ancient Patala, founded by Alexander the Great, 325 B.C.; is the commercial center of the district of the same name, and is celebrated for its manufactures of ornamental silks, silver and gold work, and lacquered ware. Pop. (1901) 69,378.

Haiduk (hī'dŏk), **Haj'duk,** or **Hay'duk,** Magyar inhabitants of the district of Hajdu Kerület, E. Hungary. They are Calvinists, and descendants of Bockskay's soldiers. From 1605 to abt. 1700 they were free from taxation and had the privileges of nobles. They are chiefly agriculturists, and are estimated to number 70,000. The name signifies "shepherds"; sometimes designates the militia of the country, and frequently is incorrectly applied to menial attendants at German courts.

Hail, small masses of ice which fall from the clouds. Frozen precipitation from the air may be snow, which is in crystals; sleet, in part liquid and in part frozen; ball snow, small opaque balls, like small shot; and hail. Snow belongs to the winter season, ball snow to the spring and autumn, and hail to the summer, while the occurrence of sleet is more a question of climate than season. Hailstones



VARIOUS FORMS OF HAIL.

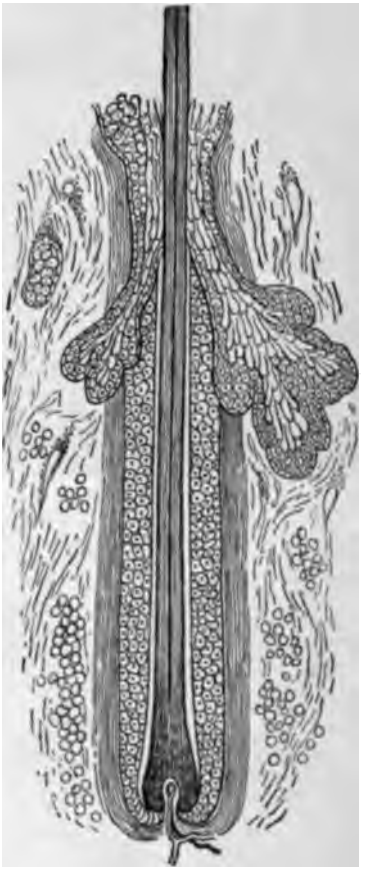
clash together in the air, and the sound of an approaching or retreating hailstorm is very characteristic. Their large size permits them to acquire great velocity while falling, and this makes a hailstorm destructive. The prevailing theory as to the formation of hail is that powerful ascending air currents carry raindrops and ball snow upward, where they are frozen and chilled, forming bodies on which rapid condensation takes place when they fall to a warm and moist stratum below. This theory explains the layering of structure often found, but does not explain the angularity of many hailstones.

Hainan (hī-nän'), island of China, in the China Sea; area, 13,600 sq. m.; pop. estimated at 2,500,000 Chinese, and tribes in the interior; forms part of the province of Kwangtung, and lies off the peninsula of Lienchow, from which it is separated by the Strait of Hainan, 15 m. broad and of difficult navigation. The S. coast has several commodious and safe harbors. The interior is mountainous and barren, and occupied by the Li, a distinct race claiming to be independent. The low lands near the sea are fertile and well cultivated. Great quantities of dried and salted fish are sent to Canton. The capital is Kiung-chow, on the N. coast.

Hainaut (hā-nō'), or **Hainault**, province of Belgium, bordering on France; area, 1,437 sq. m.; pop. (1900) 1,142,954; capital, Mons; is watered by the rivers Sambre, Scheldt, Dender, and Haine, from the last of which it is named; is rich in minerals, the coal mines producing about 10,000,000 tons a year. The territory was anciently called *Hanagadensis Comitatus* and *Hannonia*; was long governed by its own counts, and fell to Austria, 1477. In 1793 it was annexed to France; 1815–30, it belonged to the Netherlands, and in latter year was incorporated with Belgium.

Hair, the characteristic skin appendage of mammals, whose purpose is to regulate the body heat, and in some cases act as a kind of sense organ, as in the whiskers of some animals.

Hairs consist entirely of cells similar to those composing the skin (epidermis). The soft hairs of the human head or beard range from .0015 to .004 in. in thickness; the stiff hairs of the eyelashes may be as thick as



ROOT OF A HUMAN HAIR BENEATH THE SKIN, HIGHLY MAGNIFIED, SHOWING THE TWO CLUSTERS OF OIL GLANDS.

.0011 in.; while the downy hairs of the general surface vary from .0005 to .001 in. Each hair is covered by a *cuticle* of a single layer of flattened scales, which overlap like the shingles on a roof; the arrangement of these cells, as well as the grains of pigment and air bubbles in the hair, determine its color. Inside the cuticle is a *pith* of granular, many-

sided cells, in the midst of which, in many hairs, especially in white hairs, masses of air are contained. Each hair grows from a little pit in the skin, known as a hair follicle, in which grows the root, consisting chiefly of young, growing cells. The curving of these follicles in the negro race causes their typical kinky hair. The papilla at the base of the root, which is entered by two smaller arteries, supplies the materials necessary for growth.

Each hair has attached to it a little bundle of muscle fiber, which is not under the control of the will, but which will contract and raise the hair under the influence of emotion, such as fear, and, in a lesser degree of contraction, cause "goose flesh." Sebaceous glands open into the hair follicles, the purpose of their secretion being to keep the hair soft and oily. The average length of hair in women is 22 to 28 in.

Hairs (of plants), projecting parts of many of the external cells of the larger plants, resembling hairs, and technically known as *trichomes*. Many hairs are single cells, which may be unbranched, or they may be branched. The uses of hairs are many. When young they are often aërating organs. In many cases they protect the surface against the direct action of dry air. Glandular hairs are protective against insects and other animals, as are also the prickly and stinging hairs. Root hairs are organs of absorption, and supply the plant with a large part of its watery solutions. The hairs on seeds, as in cotton, cottonwood, etc., are for the purpose of distributing the seeds by attaching them to moving objects, or by floating upon water or air currents.

Haiti (hā'tĭ), second largest island in the W. Indies; separated from Cuba by the Windward Passage and from Porto Rico by the Mona Passage; area, about 29,000 sq. m.; E. and larger portion occupied by the Republic of Santo Domingo; W. portion by the Republic of Haiti. The island was discovered by Columbus, 1492, and, at Isabella on the N. shore, was founded the first Spanish colony in the New World. Santo Domingo was founded August 4, 1496. Abt. 1632 the French took possession of the W. shore, and by the Treaty of Ryswick, 1697, the W. portion of the island was guaranteed to them. Their colony rapidly assumed importance, while the E., or Spanish portion, made little progress. In 1790 the population of the W. colony was about 500,000, of whom 38,360 were of European origin and 28,370 free people of color (mostly mulattoes), the remainder being negro slaves.

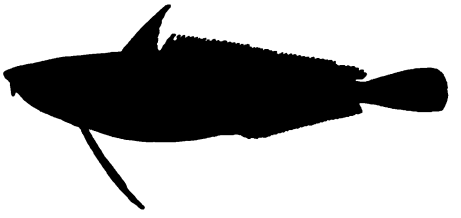
The whites proclaimed the adhesion of the colony to the principles of liberty, equality, and fraternity evolved by the French Revolution, but refused to apply these principles to the mulattoes. About 300 of the latter thereupon, in October, 1790, rose in insurrection, which was cruelly suppressed. On August 23, 1791, the slaves rose, and soon after the mulattoes joined them, the French National Assembly having, on the remonstrance of the white colonists, repealed a decree of May 15th, which conferred the privileges of citizenship on the mulattoes. The war was waged with great ferocity, the insurgents, under able chiefs, defying all efforts to subdue them. At length, in August, 1793, the French commissioners proclaimed universal freedom, and the National Convention confirmed their action, 1794.

Meantime the Spaniards and English invaded the colony. The blacks under Toussaint l'Ouverture now joined the French, drove back the Spaniards, and finally, 1797, expelled the English from the island, which then, by the treaty of 1795 with Spain, belonged wholly to France. The French were driven out by Toussaint l'Ouverture, 1801, and for a time the whole island was an independent country under his rule; but the French returned, 1802, and remained masters of the E. portion till 1809, when Santo Domingo and Samana were taken by the English and turned over to Spain. A revolt, 1822, again united the whole island in the Republic of Haiti; another revolution was followed by the separation of the two portions, the Republic of Santo Domingo being created in the E. portion, 1844. From this point the history of the island is the joint one of the two republics. Pop. (1901) 1,794,000.

Haiti, republic occupying the W. and smaller portion of the island variously called Haiti and Santo Domingo, in the W. Indies; area estimated at 10,204 sq. m.; pop. (1906) 1,500,000; capital Port au Prince (70,000); other chief cities: Cape Haiti (29,000), Les Cayes (25,000), Gonaives (18,000), Port de Paix (10,000). The country is traversed by a volcanic range with lateral spurs; highest peak, Cibao, 7,000 ft.; rivers few and unnavigable; lakes numerous; one, the salt lake of Henriquillo, has subterranean connection with the Caribbean Sea; climate, semitropical; mineral resources known to be valuable, but undeveloped; chief products, coffee, cocoa, cotton, and tobacco. The government under the constitution modeled after that of the U. S., and last revised, 1889, vests the executive authority in a president, elected for seven years by the congress in joint session, and the legislative, in a congress, consisting of a senate of thirty-nine members, elected for six years, and a House of Representatives of ninety-five members, elected for three years. The president is assisted by a cabinet consisting of the chiefs of four executive departments. Roman Catholicism is the state religion, but other creeds are respected; primary education is free, the government supporting over 400 national schools; official language and that of the educated, French. The revenue is almost exclusively from customs; expenditure largely for debt charges; each under $3,500,000. The history of the republic since the creation of the Republic of Santo Domingo (*q.v.*) is simply a narrative of revolutions.

Hake, a fish of the cod family. The European hake is abundant in the ocean and in the Mediterranean, and resorts to the coasts of Ireland and Cornwall; grows to a length of 1 or 2 ft.; flesh is white and flaky, and is

dried like that of cod. The American hake, generally called "whiting" in New England, is found from New York N., and is especially abundant in the British provinces; is also 1

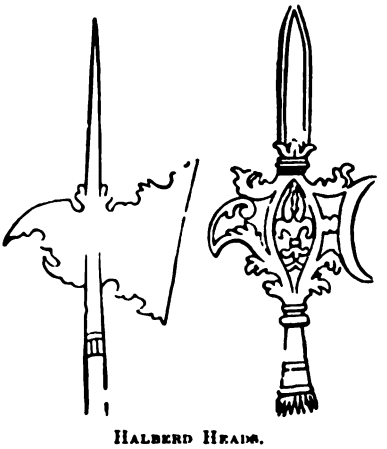


WHITE HAKE.

or 2 ft. in length; flesh sweet when fresh, but soon grows tasteless. The white hake, 1 to 3 ft. in length, is excellent for the table, and is salted and exported from the British provinces in large quantities.

Hakim'-Ben-Al'lah, or **Ben-Ha'shem**, Arabian impostor of the eighth century; also known under the name of Mokanna and Segende Nah. He succeeded in gathering a number of adherents, with whom he seized several strong places near Nekshib and Kish. The Caliph Mahdi sent an army against him, and soon all his strongholds were taken. Shut up in the last of his fortresses, he poisoned his soldiers by wine at a banquet, and burned himself up in order to make people believe that he had ascended bodily to heaven. Moore has used the story of Hakim-Ben-Allah's life for the episode of the Veiled Prophet of Khorassan in "Lalla Rookh."

Hakluyt (hăk'lōt), **Richard**, 1553–1616; English author; b. London; was lecturer on Cosmography at Oxford, and was the first to teach the use of globes; was afterwards Prof. of Divinity, and, 1584–89, was in Paris, where he published several works. On his return he joined Raleigh's company of gentlemen adven-



HALBERD HEADS.

turers and merchants for colonizing Virginia. His chief work is "The Principal Navigations, Voyages, and Discoveries made by the English Nation," commonly called "Hakluyt's Voyages." His name is perpetuated in Hakluyt's Head, a promontory on the NW. end of Spitzbergen; in Hakluyt's Island in Baffin Bay; and in the Hakluyt's Society, founded, 1846, for the republication of early voyages and travels.

Hal'berd, a weapon combining a long cutting edge on one or on each side with the head of the lance, and mounted on a long handle. During the Middle Ages and the sixteenth century it assumed many different forms. It was once borne by bodies of troops called halberdiers and by various noncommissioned officers. Its use is now limited to ceremonial occasions.

Halberstadt (häl'bĕr-stät), town of Prussia; province of Saxony, on the Holzemme; 29 m. SW. of Magdeburg; is an old town; many of its houses are ornamented with curious wood carvings; its cathedral, rebuilt in the thirteenth century, and restored between 1850 and 1871, is in the finest Gothic style, and contains many interesting antiquities; the Church of Our Lady, built in the eleventh century, is in the Byzantine style. Halberstadt has considerable manufactures of soap, oil, leather, gloves, etc. The most important educational institutions of the town are the gymnasium, a first-class Realschule, the normal school, the deaf-and-dumb institute, and the Provincial Trade School. Pop. (1900) 42,810.

Halbig (häl'bĭkh), **Johann**, German sculptor, 1814–82; b. Donnersdorf, Bavaria; became Prof. of Statuary at Munich, 1845, and is said to have modeled over 1,000 busts. His celebrated works include the group of lions at the Munich Gate of Victory, the statue of Christ in the Campo Santo of Munich, and an allegorical group representing N. America for a resident of New York. His colossal group of the Crucifixion was erected on the mountain near Oberammergau, 1875.

Halcyon (häl'sĭ-ŏn). See KINGFISHER.

Halcyon Days, a name given by the ancients to the seven days which precede and the seven which follow the shortest day of the year, on account of a fable that during this time, while the halcyon bird or kingfisher was brooding, there always prevailed calms at sea. From this the phrase "halcyon days" has come to signify times of happiness and tranquillity.

Halcyone (häl-sĭ'ō-nē). See ALCYONE.

Haldeman (hôl'dĕ-mŭn), **Samuel Stehman**, 1812–80; American naturalist; b. near Columbia, Pa.; while employed in the geological survey of Pennsylvania, 1837, discovered the *scolithus linearis*, the oldest fossil then known; held professorships of Natural History, Geology, and Chemistry in several institutions, and of Comparative Philology in the Univ. of Pennsylvania; made contributions to entomology, conchology, and philology; and his "Analytic Orthography," 1858, gained in England a prize over eighteen competitors.

Hale, Edward Everett, 1822–1909; American clergyman and author; b. Boston, Mass.; licensed to preach, 1842; pastor of Church of

the Unity, Worcester, Mass., 1846–56, and of the South Congregational (Unitarian) Church, Boston, after 1856; elected chaplain U. S. Senate, 1904; promoter of Chautauqua circles, Harry Wadsworth clubs, Lend-a-Hand clubs, and other social, educational, and philanthropic organizations; widely popular lecturer and contributor to periodical literature; editor of various religious and other publications; author of a long list of inspiring works in history, biography, and fiction, largely adapted to youth, of which the best-known include "The Man Without a Country," "Ten Times One is Ten," "His Level Best," "In His Name," "If Jesus Came to Boston," "We, the People," "Chautauquan History of the United States," "Sketches in Christian History," and "New England Ballads."

Hale, Horatio, 1817–96; American ethnologist; b. Newport, N. H.; son of David and Sarah J. Hale; was appointed, 1838, philologist to Capt. Wilkes's scientific expedition, which made a three-year exploration of the Antarctic and S. Pacific seas, where he studied native languages and customs, and so was led into the allied science of ethnology. After his return he traveled widely and pursued investigations in literature and anthropology. Still later he was admitted to the Chicago bar, and practiced at Clinton, Ontario, Canada, where he died. Some of his memoirs and monographs provoked much discussion, notably that on "The Origin of Language and the Antiquity of Speaking Man." Besides this he published "Ethnography and Philology," being the seventh volume of the Wilkes Expedition reports; "The Iroquois Book of Rites," "Indian Migrations as Evidenced by Language," and a "Report on the Blackfoot Tribes."

Hale, Sir Matthew, 1609–76; English jurist; b. Alderley, Gloucester; entered Lincoln's Inn for the study of law, 1628, and was there called to the bar; entered Parliament, 1654; was a judge of Common Pleas under Cromwell, 1654–58; member of the Convention Parliament, 1660; took an active part in the restoration of Charles II; made chief baron of the exchequer and knighted, 1660; was Chief Justice of the King's Bench, 1671–76. After his death were published several works which have created for him a high reputation as a legal and constitutional writer. Chief among them are the "History of the Pleas of the Crown" and "History and Analysis of the Common Law."

Hale, Nathan, 1755–76; American patriot; b. Coventry, Conn.; graduated at Yale College, 1773; became a teacher; 1775, entered the army as lieutenant, in a few months was made captain; in September, 1776, when in New York, he with an associate captured a British sloop laden with provisions; after the retreat of the army from Long Island, Hale, under directions from Washington, passed in disguise to the British camp, and made full drawings and memoranda of the situation; on his return was captured and taken before Sir William Howe, under whose orders he was hanged as a spy in New York city, September 22d. A statue of him was erected in City Hall Park, New York, 1893.

Hales, Stephen, 1677–1761; English clergyman; was a member of the Royal Society and foreign associate of the French Academy of Sciences; works include "Vegetable Staticks," 1727–31, one of the earliest works on vegetable physiology, which has been translated into several languages.

Halévy (ä-lā-vē'), **Jacques François Fromental Elie,** 1799–1862; French composer, of Jewish parentage; b. Paris; wrote more than thirty operas, the most popular of which are "La Juive," "L'Éclair," "Le val d'Andorre," and "Le Juif errant"; also wrote "Leçons de lecture musicale," adopted as a text book in the schools of Paris; "Souvenirs et portraits, études sur les beaux-arts" and "Derniers souvenirs et portraits." He succeeded Fétis as Prof. of Composition at the Conservatory.

Halévy, Ludovic, 1834–1908; French dramatist; b. Paris; son of the preceding; became one of the most popular authors of light plays or vaudevilles for the French stage; wrote, chiefly in connection with Henri Meilhac, nearly all the librettos of the opéra-bouffe composer Offenbach. Among the works of these authors are "La Belle Hélène," "Orphée aux Enfers," "Barbebleue," "La Vie Parisienne," "La Grande Duchesse de Gérolstèin," "Les Brigands," "Carmen." In connection with Meilhac he produced a large number of dramatic works, including "Le Menuet de Danaé," "Le Brésilien," "Tout pour les Dames!" "Froufrou," "Le Roi Candaule," "La Cigale," "La Roussotte." He has, in addition, published numerous romances, among which "L'Abbé Constantin" is notable. In 1886 he was admitted to the French Academy.

Half Ca'dence, in music, the name sometimes applied to a cadence on the dominant, otherwise called the "imperfect" cadence, as contradistinguished from the perfect on the tonic.

Half'castes. See EURASIANS.

Half Note. See NOTE.

Half'tone. See PHOTO-ENGRAVING.

Hal'iburton, Thomas Chandler, 1797–1865; Canadian jurist and humorist, known by the *nom de plume* of "Sam Slick"; b. Windsor, Nova Scotia; became Judge of the Supreme Court of Nova Scotia, 1842; removed to England, 1856, and sat in Parliament from 1859 till his death; works include "The Clockmaker, or Sayings and Doings of Samuel Slick of Slickville" (three series, 1837–40), "Historical and Statistical Account of Nova Scotia," "The Attaché, or Sam Slick in England," "Bubbles of Canada," and "Rule and Misrule of the English in America."

Hal'ibut, large fish of the family *Pleuronectidæ*, sometimes found to weigh more than 600 lbs.; is caught on both sides of the Atlantic, and especially near Greenland and Ice-

land and on the Banks of Newfoundland in the winter season; is also abundant in the

HALIBUT.

waters of Alaska, and is found on offshore banks as far S. as Monterey.

Halicarnas'sus, modern name BUDRUM, Greek city of Caria, the birthplace of Herodotus; in a crescent-shaped bay on the N. side of the Ceramian Gulf; was colonized by Dorians from Trœzene; though Greek in language and culture, became the great center of Persian influence. Alexander was unable to take its citadel, but destroyed the rest of the town, which never regained its greatness. The tomb of Mausolus, which was erected by his wife Artemisia (abt. 350 B.C.), was reckoned by the Greeks as one of the seven wonders of the world. Pop. abt. 6,000.

Hal'icore. See DUGONG.

Hal'ifax, Charles Montague (Earl of), 1661–1715; English statesman; b. Horton, Northampton; appointed a commissioner of the treasury, 1692, and First Lord of the Treasury, 1698; made Baron Halifax, 1699, but, 1701, and, 1703, was impeached by the House of Commons, and escaped only by the protection of the House of Lords; on the accession of George I was made Premier, Earl of Halifax, Knight of the Garter, etc., but died soon after.

Halifax, George Saville (Marquis of), 1630–95; English statesman; in 1688 he was made Baron Saville and Viscount Halifax for his participation in the Restoration, and, 1680, it was due to his eloquence that the House of Lords rejected the bill excluding the Duke of York from the succession. James II distrusted him, and when, 1685, he opposed the repeal of the Test Act and the Habeas Corpus Act, he was dismissed from office. After William's accession he was made Lord Privy Seal, but afterwards joined the opposition and even entered into negotiations with the Jacobites. His party was contemptuously called the Trimmers, a name which he adopted and defended.

Halifax, town of England, county of York; on the Hebble; 194 m. NNW. of London. Its carpet works are the largest in the world, and its manufactures of woolen and worsted rank next to those of Leeds and Bradford. There are also manufactures of chemicals, iron, boots, and mill machinery. It has several parks, a free library and museum, a grammar school, a bluecoat school, a flourishing co-operative society, a mechanics' institute, etc. Pop. (1901) 104,997.

Halifax, capital of province of Nova Scotia and of Halifax Co.; on a peninsula formed by its harbor and the NW. arm inlet. The harbor extends 16 m. in from the ocean, is one of the finest in the world, easy of access, admirably sheltered, and strongly fortified. The city has long been the chief naval station of Great Britain in N. America, and till 1906 was the only town there garrisoned with British troops. In that year the British Govt. withdrew the imperial troops from Halifax, leaving the military force of the Dominion exclusively Canadian. It was founded by Lord Cornwallis, 1749; named after the Earl of Halifax, who took an active part in fitting out the expedition for the founding of the city.

Halifax is the residence of a Roman Catholic archbishop and an Anglican bishop. It has a well-equipped academy and a university (Dalhousie), with faculties of art, science, law, and medicine; also a Presbyterian theological college, a women's college, a convent, a school for the blind, and a school for the deaf, besides many other benevolent and charitable institutions. The city carries on a large business with the W. Indies, exporting fish, lumber, and agricultural produce, receiving in return sugar and other tropical products. It is also a distributing center for the imports of a large part of the maritime provinces and is the chief winter port of Canada. Lines of steamers connect the city with the different ports of the maritime provinces, the leading ports of Great Britain, the W. Indies, Boston, and New York. Halifax is connected with the railway system of the continent, being the Atlantic terminus of the Canadian Pacific and Intercolonial railways. Its industries include sugar refining, distilling, brewing, iron founding, and the making of leather, shoes, soap, cordage, gunpowder, paper, and cotton and woolen goods. Pop. 47,000.

Hall, Charles Francis, 1821–71; American Arctic explorer; b. Rochester, N. H.; became a blacksmith, but removed to Cincinnati, where he was a stationer and journalist; became deeply interested in the fate of Sir John Franklin, and, 1860, sailed from New London in the ship *George Henry*, the expedition being fitted out chiefly at the expense of Henry Grinnell, of New York. Hall remained two years with the Eskimos; published his "Arctic Researches," 1864, and soon sailed again for the North in the *Monticello*; remained in the polar regions until 1869, when he returned, bringing undoubted relics of the Franklin party. In 1871 he sailed on his third expedition in the steamer *Polaris*, fitted up by the U. S. Govt.; died in Greenland.

Hall, Granville Stanley, 1846– ; American educator; b. Ashfield, Mass.; lecturer in Harvard and Williams colleges, 1880–81; Prof. of Psychology, Johns Hopkins Univ., 1881–88; president of Clark Univ., Worcester, Mass., after 1888; author of "Aspects of German Culture," "How to Teach Reading and What to Read in Schools," "Adolescence, Its Psychology," "Youth," and numerous articles on psychology and education in reviews and magazines; editor of *The American Journal of*

Psychology, The Pedagogical Seminary, and *The American Journal of Religious Psychology and Education.*

Hal'lam, Arthur Henry, 1811–33; English author; b. London; son of the historian Hallam; studied law in the Inner Temple, 1832; went to Germany for his health, and died at Vienna. He is memorable as the subject of Tennyson's "In Memoriam."

Hallam, Henry, 1777–1859; English historian; b. Windsor; practiced law for several years, then became commissioner of stamps, which position, imposing light duties and affording a fair salary, supplemented by his private means, enabled him to devote himself almost wholly to study; published "A View of the State of Europe in the Middle Ages," 1818, which gave him a place among the foremost historians of his time; "Constitutional History of England, from the Accession of Henry VII to the Death of George II," 1827; "Introduction to the Literature of Europe in the Fifteenth, Sixteenth, and Seventeenth Centuries."

Halle (häl'lē), town of Prussia; province of Saxony, on the Saale; 21 m. NW. of Leipzig; has manufactures of agricultural machinery, sugar, woolens, and starch, and very extensive salt works. The university (founded 1694) with which that of Wittenberg (founded 1502) was united, 1817, has ranked high, especially in theology; students, about 1,800. The Francke Institution is a remarkable organization which takes care of several thousand orphan children. Its schools are celebrated, and it carries on an extensive publishing business. Halle attained commercial importance in the eleventh century, and during the twelfth and thirteenth centuries was a member of the Hanseatic League. Pop. (1905) 169,916.

Hal'leck, Fitz-Greene, 1790–1867; American poet; b. Guilford, Conn.; in 1811 became, and remained for twenty years, a clerk in the house of Jacob Barker, of New York; was, 1832–49, employed by John J. Astor, who named him a trustee of the Astor Library; in 1849 returned to Guilford, Conn., where he died. The best-known of his poems are that on the death of his friend, J. R. Drake; "Fanny," his longest production; "Alnwick Castle"; "Marco Bozzaris" (first published in *The New York Review,* 1825); and "Burns." The "Croaker Papers," 1819, by himself and his friend Drake, were published in a complete edition, 1860.

Halleck, Henry Wager, 1815–72; U. S. military officer; b. Westernville, N. Y.; graduated at West Point, 1839; promoted captain of engineers, 1853; served as assistant Prof. of Engineering at West Point, and as assistant in charge of the construction of fortifications in New York harbor; delivered a course of lectures before the Lowell Institute, Boston, which were published, 1846, under the title of "Elements of Military Art and Science." In 1854 he resigned from the army and practiced law till 1861, when he was appointed major general in the regular army, and assigned to the command of the Department of the Missouri, embracing the states of Missouri, Iowa, Minnesota, Wisconsin, Illinois, Arkansas, and W. Kentucky. He commanded in person at the siege of Corinth, and after it was called to Washington as general in chief, and exercised that command until the grade of lieutenant general was revived; continued under assignment as chief of the staff of the army until transferred to the command of the Military Division of the James, 1865. On the termination of the war, Halleck was ordered to the Military Division of the Pacific, and, 1869, was transferred to that of the South, which he retained till his death; published "International Law, or Rules Regulating the Intercourse of States in Peace and War," and a translation of Jomini's "Vie Politique et Militaire de Napoleon."

Hallelu'jah ("Praise ye Jah," *i.e.,* "Jehovah"), adopted into Greek in the form ALLELUIA; ancient formula of praise, universally adopted by the Christian churches.

Hal'ler, Albrecht von, 1708–77; Swiss physician; father of the science of physiology; b. Bern; practiced medicine at Bern, 1729–36; held important professorships at Göttingen, 1736–53; became physician to the King of England, 1729; retired to private life in Bern, 1753; was a voluminous writer on physiology, anatomy, botany, surgery, and practical medicine.

Hal'ley, Edmund, 1656–1742; English astronomer; b. near London; published, 1675, a method for finding aphelia and planetary eccentricities; was in St. Helena, 1676–78, cataloguing the S. stars; published "Catalogus Stellarum Australium," 1679; while traveling on the Continent, 1680, discovered the great comet which bears his name; published, 1683, a paper giving his theory of the variation of the magnet; became a captain in the royal navy, 1699, and conducted expeditions to observe the variations of the magnetic needle; became Savilian Prof. at Oxford, 1703; secretary of the Royal Society, 1713–21; appointed astronomer royal, 1720.

Hal'liwell-Phil'lipps, James Orchard, 1820–89; English antiquarian; b. Chelsea; son of Thomas Halliwell; 1839, began his great work of the editing and publication of old English authors and MS. texts; produced numerous works, many of them original. Among these are "Shakespeariana," "A History of Freemasonry," "Dictionary of Provincial and Archaic Words," and many volumes of Shakespearian literature. In 1872 he changed his surname to Halliwell-Phillipps.

Hall of Fame, memorial structure at New York Univ., semicircular in form, connecting the university Hall of Philosophy with the Hall of Languages, and including a colonnade 400 ft. long. It has provision for 150 panels, each to bear the name of a famous American man, only those who had been dead ten or more years being eligible. The structure, the gift of a donor whose name was withheld, was dedicated 1901. The first name inscribed was George Washington; the second, Abraham

Lincoln; these and others having been suggested by the public, but passed upon by an electorate of one hundred eminent citizens. Names are to be inscribed at intervals up to the year 2000. An additional structure, for foreign-born Americans and famous American women, was projected later, and the first foreign-born man to receive the highest number of ballots was Alexander Hamilton; the first woman, Maria Mitchell.

Halloween', or **All Hal'lows' Eve**, night of October 31st—*i.e.*, the eve of All Saints' or All Hallows' Day, which is the first day of November. All Saints' (All Hallows' or All Hallow Tide) Day takes its origin from the conversion in the seventh century of the Pantheon at Rome into a Christian place of worship, and its dedication to the Virgin and all the martyrs. First celebrated May 1st, the date was subsequently changed to November 1st, and under the designation of Feast of All Saints set apart as a general commemoration in their honor, and as such retained by the Anglican and American Episcopal churches. Halloween seems to be a relic of pagan times, or perhaps of mediæval superstitions. It was regarded as the time of all others when supernatural influences prevail, and as a night which was set apart for a universal walking abroad of spirits both of the visible and invisible world; for on this mystic evening it was believed that even the human spirit might detach itself from the body and wander abroad. Halloween seems clearly allied to the "Walpurgis Night" of the Germans.

Hal'low Fair, market held in various parts of Scotland at Hallowtide.

Hallucina'tion. See INSANITY.

Halm (hälm), **Friedrich.** See MÜNCH-BELLINGHAUSEN.

Ha'lo, popular term applied to bright circles and attendant optical phenomena seen when the sun or moon shines through or on fog, haze, or cloud. For the purposes of scientific description in meteorology, halos are classified as greater or lesser halos: the former are the halos proper, while under the lesser halos are included the small rings, aureolæ, or glories known as coronæ and anthelia. According to the numerous physicists who have contributed to the explanation of the phenomena, halos are all the result of certain modifications which light undergoes by reflection, refraction, dispersion, diffraction, and interference when it falls on the crystals of ice, the raindrops, or the minute particles that constitute fog and clouds. Indeed, the rainbow may be considered as a halo due to the action upon the sun's light of large drops of water, instead of smaller drops, or of crystals of ice. In art, a halo, or nimbus, is a circle of light placed around the head of a sacred person.

Halpine (häl'pin), **Charles Graham**, 1829–68; American journalist; b. Oldcastle, Ireland; son of a Protestant clergyman and editor of the Dublin *Evening Mail*; removed to New York, 1847; was connected with newspapers there and in Boston till the outbreak of the Civil War, when he entered the Union army and became brevet brigadier general of volunteers, 1864; was afterwards editor and proprietor of *The Citizen*, newspaper and register of the county. Besides his humorous writings in prose and verse under the pen name of "Private Miles O'Reilly," while in the army, he published "Lyrics," "Poems," "Life and Adventures of Private Miles O'Reilly," "Baked Meats of the Funeral," etc.

Hals (häls), **Frans**, abt. 1580–1666; Dutch painter; b. probably at Antwerp; is said to have been a pupil of Rubens; lived chiefly in Antwerp and Haarlem; was one of the greatest of portrait painters, and had an exceptional power of combining a number of portrait figures in a large composition. From 1620 to 1660 is his great epoch.

Halstead (häl'stĕd), **Murat**, 1829–1908; American journalist; b. Butler Co., Ohio; became a local reporter on the Cincinnati *Enquirer*, then news editor of the Cincinnati *Atlas*, and literary editor of *The Columbian and Great West*; 1853, became connected with the Cincinnati *Commercial*, and, 1856, the chief editor and proprietor. When the Cincinnati *Commercial* and *Gazette* were consolidated, 1882, he continued as chief editor; became editor of *The Standard-Union*, Brooklyn, N. Y., 1890; author of "The History of American Expansion," "The War between Russia and Japan," and other works.

Ham, son of the patriarch Noah, and the brother of Shem and Japheth; also, according to Genesis, the father of those nations which inhabited the S. countries, Egypt, Libya, etc. The descendants of Ham were not all African. The Canaanites and Phœnicians, the Cushites of the Euphrates Valley, a S. Arabian race of importance, all were Hamitic. Some of these peoples were closely associated with the Semitic races, and their languages belonged to the class now described as Semitic.

Hamadan (hä-mä-dän'), town of Persia; province of Irak-Ajemee; at the base of the Elwund Mountains. Its location on one of the routes from Bagdad to Erivan, Teheran, and Ispahan makes it a trading place of considerable importance. Among its most remarkable monuments are the reputed tomb of Mordecai and Esther, and that of Avicenna, yearly visited by crowds of pilgrims. Hamadan occupies the site of Ecbatana, the ancient capital of Media. It was captured by Cyrus, 549 B.C., and became the summer residence of the kings of Persia. During the reign of the Sassanidæ it lost its importance. Pop. abt. 25,000.

Hamadry'ads, or Dry'ads, in Greek mythology, nymphs who were attached to particular trees, with which they came into existence and died. They lived in the deep forests, out of which they never came; they were therefore sometimes called Oreades (from *oros*, mountain). They were often named from mountains, rivers, springs, and caves—*e.g.*, the Peliades from Mt. Pelion. They differed from most other nymphs in not possessing immortality.

Hamah (hä'mä), or **Ha'math** ("fortress"), one of the oldest cities in the world, the EPIPHANEIA of the Greeks and Romans; in Upper Syria; about halfway between Baalbek and Antioch; founded by the youngest (or last-named) of the eleven sons of Canaan. The small kingdom or province of which Hamah was the capital was in alliance with David and tributary to Solomon, but regained its independence after the revolt of the ten tribes. Hamah fell under the power of Sennacherib of Assyria, and became insignificant. Under the Arabs it was a place of considerable importance; now has about 45,000 inhabitants. A few years ago it attracted considerable attention from the number of stones bearing inscriptions which had been found there. The stones are of black basalt, and the inscriptions are in relief. The writing is in an unknown character.

Hamame'lis Virgin'ica. See WITCH-HAZEL.

Ha'man, minister of the Persian King Ahasuerus, who from enmity to Mordecai, as related in the book of Esther, resolved on the destruction of all the Jews. Queen Esther interposed, and Haman was hanged on the gibbet he had prepared for Mordecai.

Ham'burg, state and city of the German Empire. The state, which has a total area of 158 sq. m., comprises (1) the city of Hamburg, which with its suburbs had a population of 802,793 in 1905; (2) the neighboring territory of Bergedorf and some smaller districts; and (3) Ritzebüttel (including Cuxhaven), at the mouth of the Elbe, and had a total population in 1905 of 874,878, including a garrison. The free city of Hamburg was one of the principal members of the old Hanseatic League, and is the most important commercial port of the German Empire. It is the first seaport of the mainland of Europe, and after London and Liverpool the most important commercial center of Europe. The extent and value of the commerce of the city are more than double that of any other city in the empire. The manufactures are also very important. January 1, 1882, the lower Elbe was included in the Zollverein or Customs Union, and, October 15, 1888, the whole of the city, with the exception of a small portion of the actual port and warehouses connected with it, became incorporated in the Zollverein.

The city forms a semicircle on the right bank of the Elbe, the depth of whose waters at high tide allows sea-going vessels drawing not more than 18 ft. to enter the harbor, while an extensive river traffic establishes a brisk communication with the interior. Hamburg, which formerly was fortified, consists of the old and the new city, the former suburb of St. Georg, situated to the NE., and the suburb of St. Pauli, situated to the W. Besides the Elbe, it has two other small rivers: the Alster, which, coming from the N., forms within the city a small basin, called Binnen-Alster, and outside of it a larger one, called Aussen-Alster and the Bille. Both are finally discharged through canals into branches of the Elbe. The harbor affords room for 400 sea-going vessels and 400 large and several hundreds of small river craft. The finest part of the city is the Binnen-Alster, generally called the Alster Basin, and its surroundings.

Hamburg has a fine botanical garden and one of the best zoölogical gardens in Germany. Its remarkable buildings include the Art Gallery, the Bourse, which contains a commercial library; the bank; the Nicolai Church; the Catharine Church; the Grosse Michaelis Church; the Johanneum, containing a library of 600,000 volumes; and the Thalia Theater.

The government consists of two chambers of representatives: the Senate and House of Burgesses. The executive power is exercised chiefly but not entirely by the Senate, which is composed of 18 members, elected for life by the House of Burgesses; a first and second burgomaster, chosen annually in secret ballot, preside over the meetings of the Senate. The House of Burgesses consists of 160 members, elected half by secret ballot of all tax-paying citizens, half of the remainder by the owners of a certain amount of city property, and the remainder appointed by various guilds, corporations, and courts of justice.

In 834, when Hamburg was created an archbishopric, it was only a miserable fishing village. In 1215 it was made a free city. In 1242 it made a covenant with Lübeck by which the foundation was laid for the Hanseatic League, to which Hamburg owes much of its commercial importance and all of its political influence. In 1770 it acquired a vote in the German Diet. On December 13, 1810, it was incorporated into France, and suffered very much during the sieges of 1813 and 1814. In 1867 it became a member of the N. German Confederation, and, 1871, of the German Empire.

Hameln (hä'mĕln), town of Hanover, Prussia, on the Hamel and the Weser, 24 m. SW. of Hanover. Over the Weser, which here forms an island, is a suspension bridge more than 800 ft. long. It has woolen and cotton factories, distilleries, and breweries. Hameln is famous as the scene of the legend of the piper of Hameln, who offered to clear the town of rats for a certain sum of money. The vermin followed him as he played on his pipe, and were all drowned in the Weser. The people refused to pay the stipulated sum, and the piper, on June 26, 1284, reappeared in the streets playing his pipe, and all the children followed him into a cavern of the mountain and were never afterwards heard from. For a long time the town dated its public documents from this calamity. The legend is the subject of a poem by Robert Browning. Pop. (1900) 18,965.

Hamerling (hä'mĕr-lĭng), **Robert,** 1830–89; Austrian poet; b. Kirchberg am Wald; taught in the academic gymnasia of Vienna and Graz; was professor in the gymnasium at Trieste, 1855–66; then returned to Graz, to devote himself to authorship; produced poems, plays, and romances, including "Ahasuerus in Rome," "The King of Zion," "Danton and Robespierre," "The Seven Deadly Sins," and "Cupid and Psyche."

Ham'erton, Philip Gilbert, 1834–94; English artist and author; b. Manchester; devoted himself to landscape painting, living much in the wildest parts of Scotland; after 1850, lived chiefly at Autun, France; originated a new process for etching; but his devotion to literature interfered with his success as an artist; author of "Isles of Loch Awe" (poems), "Painter's Camp in the Highlands," "Thoughts about Art," "Etching and Etchers," "Contemporary French Painters," "Etcher's Handbook," "The Unknown River," "The Intellectual Life," "Chapters on Animals," "Life of J. M. W. Turner," "Modern Frenchmen," "The Graphic Arts," "Landscape," and other works.

Hamil'car, surnamed BARCA or BARAK ("lightning"), Carthaginian military officer; appointed commander of the army in Sicily, 247 B.C., during the first Punic War; took a position on Mt. Ercta, near Palermo, and later one on Mt. Eryx, from which the Romans vainly tried to dislodge him; was compelled to capitulate by the defeat of the Carthaginian fleet, 242. Peace was concluded soon after, and Carthage lost Sardinia and Sicily. Returning to Carthage, he engaged in a three years' struggle to subdue his mercenary troops, who had revolted, and was eventually successful. As commander in chief of the army he invaded Spain, 236, and brought the E. and S. part under Carthaginian rule; was killed in a battle against the Vettones. The great Hannibal was his son.

Ham'ilton, Alexander, 1757–1804; American military officer and statesman; b. Island of Nevis, W. Indies; son of a Scotchman; was educated at King's (now Columbia) College, New York; became a captain of artillery in the Revolutionary army; became aid-de-camp to Washington with rank of lieutenant colonel, 1777; resigned in consequence of a reproof from Washington, 1781, but became lieutenant colonel of a New York battalion of light infantry; at Yorktown charged the redoubts at the head of his troops. He next studied law; was a member of Congress, 1782–83, 1787–88; served in the convention which drew up the Federal Constitution, where all his powers were exerted to give strength to the Federal authority; was the principal author of the papers afterwards collectively called "The Federalist"; was the first Secretary of the U. S. Treasury, 1789–95; author of the funding system; founder of the U. S. bank and restorer of public credit; as leader of the Federalists, was involved in controversies with Jefferson and Monroe; in 1798, during the troubles with France, was inspector general of the army, with rank of major general, and, 1799, for a short time commander in chief; was chosen president general of the Cincinnati, 1800; 1804, was challenged by Aaron Burr, who ascribed his defeat in his candidacy for the governorship of New York to Hamilton; consented to the duel, which took place at Weehawken, N. J., July 11th, and received a wound from which he died on the following day.

Hamilton, Emma (LYON), better known as LADY HAMILTON, 1764–1815; English adventuress, noted for her beauty; came of low family; lived with and finally married Sir William Hamilton, the diplomatist; was presented by him at the Court of Naples; formed a *liaison* with Lord Nelson; died in poverty at Calais, France; left a daughter, whom she had named Horatia Nelson; Romney, the painter, represented her in many works.

Hamilton, Frank Hastings, 1813–86; American surgeon; b. Wilmington, Vt.; 1846, became Prof. of Surgery at Buffalo Medical College; 1858, of Principles and Practice of Surgery in Long Island College Hospital, Brooklyn, N. Y.; 1861, of Military and Clinical Surgery in Bellevue Hospital Medical College, New York; 1868–75, of Principles and Practice of Surgery with Operations in same institution; military surgeon and medical director for two years during Civil War; was one of the consulting surgeons in the case of Pres. Garfield; and author of many valuable books on surgery, including "Treatise on Fractures and Dislocations," "General Treatise on Military Surgery," and "The Principles and Practice of Surgery."

Hamilton, Gavin, 1730–97; Scottish artist; b. Lanark; made a large collection of ancient Roman monuments and statues, now in the Towneley gallery of the British Museum, and published "The Italian School of Painting," with forty plates.

Hamilton, Lord George Francis, 1845– ; English statesman; b. Brighton; entered the army, 1864; returned to Parliament, 1868 and 1874, as a Conservative at the head of the poll in what had formerly been a strong Liberal district; was Under Secretary of State for India in Disraeli's administration, 1874; First Lord of the Admiralty in Lord Salisbury's administrations, 1885–86 and 1886–92; Secretary of State for India, 1895–1903.

Hamilton, James, 1786–1857; American statesman; b. Charleston, S. C.; son of Major James Hamilton of Washington's staff; served in the War of 1812; was Mayor of Charleston; as member of Congress, 1822–29, earnestly advocated state rights, free trade, direct taxes, and armed resistance to the tariff of 1828; as Governor of S. Carolina, 1830–32, recommended the passage of the Nullification Act; afterwards was made major general, commanding the state troops; removed to Texas; was influential in securing the recognition of the republic by Great Britain and France; appointed minister plenipotentiary from Texas to the European powers; elected from Texas to the U. S. Senate, 1857.

Hamilton, William, 1788–1856; Scottish philosopher; b. Glasgow; son of Dr. William Hamilton; Prof. of Anatomy and Botany in the university; graduated at Oxford with unprecedented honor, 1810; passed his examination as an advocate, 1813; claimed the title of Sir, long in abeyance in his family, 1816, and won his claim; became Prof. of Civil History in the Univ. of Edinburgh, 1821; had a controversy with George Combe on the subject of phrenology; wrote for the *Edinburgh Review*, 1829, his celebrated criticism of

Cousin's "Cours de Philosophie," under the general title of the "Philosophy of the Conditioned"; in 1831, his discussion of the authorship of "Letters of Obscure Men"; later, articles on the English universities, the revolutions of medicine, and general and professional education. His "Philosophy of Perception" and "Recent Publications in Logical Science" are especially celebrated. In 1836 he took the chair of Logic in Edinburgh, and this he held until April, 1856. He published, 1846, his edition of the works of Reid, and, 1856, completed his edition of the works of Dugald Stewart.

Hamilton, Sir William, 1730–1803; British antiquary; b. Scotland; was a foster brother of George III, but poor, and, 1755, married a wealthy lady, who died, 1782; was appointed ambassador to Naples, 1764, and was among the first to whom the British public are indebted for a comprehensive knowledge of Greek and Etruscan antiquities, on which he published an elaborate work in French (four vols. fol., Naples, 1766). In 1784 he went to England to prevent his nephew from disgracing himself by marrying Emma Lyon, but he privately married her himself, and took her to Naples. In 1793 he effected a treaty of alliance between England and Naples. He was recalled to England, 1800, at which time he lost by shipwreck a large collection of antiquities, of which, however, drawings were preserved and published. Many of the marbles of the Towneley gallery in the British Museum were collected by him. See HAMILTON, EMMA (LYON).

Hamilton, William Richard, 1777–1859; English archæologist; b. London; became secretary to Lord Elgin in the embassy to Constantinople, 1799; secured for the British Museum the Rosetta Stone, and with the assistance of divers recovered the Elgin marbles shipwrecked near Cerigo; was Under-secretary for Foreign Affairs, 1810–22, and subsequently ambassador at Naples; published "Ægyptiaca, or some Account of the Ancient and Modern State of Egypt."

Hamilton, Sir William Rowan, 1805–65; Irish mathematician; b. Dublin; became Prof. of Astronomy and astronomer-royal for Ireland, 1827; was knighted, 1835; became president of the Royal Irish Academy, 1837; was author of valuable papers on physics and mathematics, but his fame rests on his great invention, the calculus of quaternions; principal works, "Lectures on Quaternions" and "Elements of Quaternions."

Hamilton, capital of Wentworth Co., Ontario, Canada; on Burlington Bay, the W. extremity of Lake Ontario; 40 m. SW. of Toronto. The bay, which constitutes a capacious harbor, is connected with the lake by a canal, and a deepened channel, locally known as Desjardins Canal, leads to the town of Dundas. The city has a large trade and manufactures of machinery, cotton goods, tobacco, cigars, boots, shoes, paper, sewing machines, carriages, fertilizers, wire goods, glass, gunpowder, screws, nails and tacks. Pop. 64,000.

Hamilton, capital of the Bermuda Islands; on the Great Bermuda, at the head of Great Sound; was founded 1790, and consists of an irregular half street fronting a line of wharves. Pop. (1901) 2,246.

Hamilton, capital of Butler Co., Ohio; on the Great Miami River and the Miami and Erie Canal; 25 m. N. of Cincinnati. The river affords unlimited water power for its industries, which include the manufacture of railway supplies, burglar and fireproof safes, reapers, mowers, threshers, engines, wood-working machinery, cordage, paper, woolen goods, flour, bent wood, etc. Pop. (1906) estimated 27,670.

Hamilton, a river of Labrador. See ASHWANIPI.

Ham'let, the hero of Shakespeare's tragedy; a prince who belonged to the mythical period of Danish history, but who, for many centuries, was the subject of tradition among the Danish people; his grave is still shown near Elsinore, and the part of Jutland's Heath where he fought the battle with Viglet is still called Hamlet's Heath. His life has been told by Saxo Grammaticus, a Danish historian of the twelfth century, but there is no direct connection between Saxo's story and Shakespeare's tragedy. See AMLETH.

Ham'lin, Cyrus, 1811–1900; American missionary and scholar; b. Waterford, Me.; was a missionary of the American Board of Missions in Turkey, 1838–59, when he became president of Robert College, 1860–76, which he placed on a sure footing after a long struggle with the Turkish authorities. In 1877 he became Prof. of Dogmatic Theology in Bangor Theological School; was president of Middlebury (Vt.) College, 1880–85; published "Among the Turks" and "My Life and Times."

Hamlin, Hannibal, 1809–91; Vice President of the U. S.; b. Paris, Me.; admitted to the bar, 1833; several times elected Speaker of the Maine House of Representatives; was, 1843–47, a Democratic representative in Congress; U. S. Senator, 1848–57, 1857–61, and 1869–81; Governor of Maine, 1857, but resigned on his reëlection to the U. S. Senate; was, 1861–64, Vice President of the U. S. during Mr. Lincoln's first term; 1865, was for a time collector of the port of Boston; was again elected U. S. Senator, 1869, and reëlected, 1875; U. S. Minister to Spain, 1881–83.

Hamlin. See HAMELN.

Ham'merfest, town of Norway; in Finmark; northernmost town in Europe; was founded 1787. In the summer, during which the sun does not set from May 13th till July 29th, the harbor of Hammerfest is the rendezvous of more than 200 fishing vessels; fishing is carried on, however, the year round. Furs and eiderdown are exported. Pop. (1900) 2,298.

Ham'merhead, any shark of the genus *Sphyrna*. These sharks, when adult, have the two sides of the head produced laterally till the head has somewhat the shape of a double-

headed hammer. There is an eye on each end of the head. These fishes are very voracious, and extremely prolific, especially in warm seas. The *S. zygæna*, a man-eating shark, has been often caught on both sides of the N. Atlantic.

Ham'mer-Purgstall (-pôrkh'stäl), **Joseph von,** 1774–1856; Austrian Orientalist; b. Grätz; held various positions, such as interpreter to the internuncio at the Porte, secretary of the Austrian legation in Turkey, court interpreter at Vienna, aulic counselor, president of the Academy of Vienna, 1847–49; was made a baron, 1837; published many learned works on E. history, etc., including "History of Arabic Literature," "History of the Ottoman Empire."

Ham'mond, William Alexander, 1828–1900; American surgeon; b. Annapolis, Md.; entered the U. S. army as assistant surgeon general, 1849; resigned to become Prof. of Anatomy and Physiology in the Univ. of Maryland, 1860; reëntered the army at outbreak of the Civil War; became surgeon general with rank of brigadier general, 1862; court martialed and dismissed from the service, 1864; appointed Prof. of Diseases of the Mind and Nervous System in the College of Physicians and Surgeons, Bellevue Hospital Medical College, and the Univ. of the City of New York; was a founder of the New York Post-Graduate Medical School; was restored as surgeon general and brigadier general of the army, after review of the court martial proceedings, and placed on the retired list, 1879; author of a large number of works relating to diseases of the mind.

Hammurabi (hä-mô-rä'bi), **abt. 2240–2185** B.C., King of Babylon, who has been identified with Amraphel, King of Shinar (Gen. 14: 1). He expelled the Elamites and built up a large empire, which he appears to have ruled wisely and well. An inscription, discovered in 1902, gives 280 of his edicts apparently intended for the rule of a conquered province, and from them are learned much as to the social and industrial life of the time. He also built a large canal, granaries to store wheat as a provision against famine, and he is mentioned in many inscriptions as the builder or restorer of palaces and temples.

Hamp'den, John, 1594–1643; English statesman; b. probably in London; son of William Hampden, of Hampden, Bucks, and Elizabeth Cromwell, aunt of Oliver Cromwell; studied law, was elected to Parliament, 1621, and to the first Parliament of Charles I, 1625. When the king, after the angry dissolution of two parliaments (1625 and 1627), attempted to raise money by a forced loan from the people, Hampden refused to lend a farthing, and was imprisoned; and his example was followed by seventy-six other landed gentlemen, who were also arrested. A new parliament was summoned, and Hampden, having been liberated, was immediately reëlected; but this was also dissolved, and no other was called for eleven years. Hampden was one of the first to resist the "ship money" tax demanded by Charles in time of peace from the inland counties, and resolved to bring to a solemn hearing the great controversy between the people and their oppressor.

Toward the close of 1636 the cause came on in the exchequer chamber before the twelve judges, seven of whom pronounced against the disputant, thus placing all property at the disposal of the crown. On the assembling of the Long Parliament, 1640, Hampden was the most popular man in England. He was one of the committee of twelve to conduct the memorable trial which led to Strafford's execution. He was one of the five members accused of treason, whose persons were demanded by Charles; but he was not arrested, in spite of the most strenuous efforts of the king. He was also made a member of the committee of public safety. At the commencement of the civil war Hampden raised and commanded a regiment of volunteer infantry. He showed great bravery, especially at Edgehill and in the capture of Reading. In June, 1643, he was mortally wounded at Chalgrove Field, in an encounter between the royal cavalry under Prince Rupert and that of Parliament which Hampden commanded.

Hamp'stead, ancient village of England, now part of the suburbs of London. In a tavern at Hampstead the famous Kit-Cat Club, of which Addison, Steele, and Pope were members, held its first meetings. Hampstead Heath is a favorite resort for holiday parties.

Hamp'ton, Wade, 1754–1835; American military officer; b. S. Carolina; served under Sumter and Marion; was a member of Congress, 1795–97 and 1803–5; became a colonel in the U. S. army, 1808; brigadier general, 1809; and was major general, 1813–14; commanded, 1809–12, at New Orleans and, 1813–14, on the Canadian frontier. He resigned, 1814, and afterward acquired great wealth, at one time owning 3,000 slaves.

Hampton, Wade, 1818–1902; American military officer; b. Columbia, S. C.; grandson of Gen. Wade Hampton; member of both houses of the Legislature of S. Carolina; commanded the Hampton Legion of the Confederate army at the first battle of Bull Run, 1861; promoted to brigadier general, and in command of a brigade at Seven Pines, 1862; engaged at the battle of Antietam and in the raid into Pennsylvania, 1862; at Gettysburg, 1863; promoted to lieutenant general. He was in command of cavalry in Lee's army during campaign of 1864; subsequently transferred to S. Carolina, where, 1865, he commanded the cavalry forming the rear guard of the Confederate army retiring before Gen. Sherman's advance; prominent in the Democratic National Convention, 1868. He was Governor of S. Carolina, 1878; U. S. Senator, 1879–1891; became U. S. commissioner of railways, 1893.

Hampton, village of England, in Middlesex, on the Thames; about 15 m. WSW. of London. A mile from the village lie the palace and park of Hampton Court, erected by Cardinal Wolsey, 1514, afterward presented by him to Henry VIII, and thereafter, until the

time of George III, a royal residence. The palace contains an interesting collection of pictures. Pop. (1901) 6,813.

Hampton Nor'mal and Agricul'tural In'stitute, a school devoted to Indian and negro education; located in Elizabeth City Co., Va., on the Hampton River, 2 m. from Old Point Comfort. The institute was opened April, 1868, under the auspices of the American Missionary Association; in 1870 it received its charter from the General Assembly of Virginia, and became independent of any church organization. It is not a government, state, or denominational school, but a private corporation, controlled by a board of seventeen trustees who come from various sections of the country. In addition to the academic departments, which have day and night sessions, courses are offered in the trades and in agriculture, the school maintaining several farms where the students are taught the care of stock and how to raise different crops. The institute has about 1,300 students.

Hampton Roads, broad and deep channel leading from Chesapeake Bay into the James, Nansemond, and Elizabeth rivers; Forts Monroe and Wool serve for defense. Hampton Roads was, March 8 and 9, 1862, the scene of important naval operations—the sinking of the U. S. frigates *Congress* and *Cumberland*, and the contest between the ironclads *Monitor* and *Virginia*.

Hanau (hä'now), town of Hesse-Nassau, Prussia; at the confluence of the Kinzig River with the Main; 12 m. E. of Frankfort; is an important industrial center, and manufactures silks, gloves, hose, playing cards, ornaments of various kinds, cigars, leather, and carriages; has several metallurgical establishments and uses much platinum, and has a large trade in lumber, wood, and wine. It became the seat of an independent count in the twelfth century, was raised to the rank of a town, 1303; became a county of the empire, 1429; was taken by the Swedes, 1631; became independent, 1803, but soon fell into French hands; and was the place of Napoleon's victory of October 30, 1813. It was annexed to Prussia, 1866. Pop. (1900) 29,847.

Han'cock, John, 1737–93; American statesman; b. Quincy, Mass.; was a prominent merchant of Boston, and, 1766, was chosen to the Massachusetts House of Representatives. After the "Boston massacre," 1770, he was a member of the committee to demand of the royal governor the removal of the troops from the city; and at the funeral of the slain he delivered an address which offended the governor, who eventually endeavored to seize Hancock and Samuel Adams, both of whom, 1774, became members, and the former president, of the Provincial Congress at Concord, and were excepted from Gov. Gage's offer of amnesty. In 1775 Hancock was chosen president of the Continental Congress, and, 1776, signed the Declaration of Independence. Leaving Congress, 1777, he became a member of the convention for framing a constitution for Massachusetts, and, 1780, was chosen first governor; to which office, with an interval of two years in Congress (1785–86), he was annually reelected till his death.

Hancock, Winfield Scott, 1824–86; U. S. army officer; b. Montgomery Square, Pa.; graduated at West Point, 1844, and served in Mexico, on the frontiers, and in California; was made brigadier general of volunteers, September, 1861, and took a conspicuous part in the battles of Williamsburg, Frazer's Farm, South Mountain, and Antietam. Having been made major general, he commanded a division at Fredericksburg and Chancellorsville. He selected the field of battle at Gettysburg, commanded there till the arrival of Meade, was severely wounded, and subsequently (May 30, 1866) received the thanks of Congress.

He took the active command of the Second Army Corps at the opening of the campaign of 1864, and bore a prominent part in the battles of the Wilderness, Spottsylvania Court House, North Anna, the second battle of Cold Harbor, and the operations around Petersburg. He was promoted to major general, U. S. A., 1866; subsequently commanded several military departments; and was the unsuccessful Democratic candidate for President of the United States, 1880. His large stature and fine form caused him to be called "Hancock the Superb."

Hand, in mammals, the foremost extremity, always present, though often very much modified. When contrasted with the foot (*q.v.*) in size, there is much variety. The kangaroo has a small hand and a large foot. In the mole there is a broad, shovel-shaped hand and a delicate foot. The sloth has an exceedingly long hand. The foot of the beaver and the seal is much larger than the hand. The hand presents for study the carpus, metacarpus, and

THE HUMAN HAND.

BONES OF THE HAND.

phalanges, corresponding in general plan of structure to the tarsus, metatarsus, and phalanges of the foot. The relative dimensions of these parts vary exceedingly. The hoofed animals, the elephant, and those animals which use the forelegs mainly for support, have short and robust bones. On the other hand, the bat and pterodactyl have enormously developed fingers to support the web which gives them the wing. Climbing animals have the whole hand developed into slender and delicate manipulating organs. And in general, animals which do not enjoy *free lateral move-*

ments of the forelegs have small and diminutively modified hands.

The human hand is probably the most remarkable organ, not vital, in the whole animal kingdom. Its mechanism is somewhat complicated, and quite unlike human machinery, and its sensitiveness, suppleness, delicacy of movement, and beauty of form are marvelous in the range of animal organisms. The hand bears a very close relation in its plan of structure to the foot. Thus the foot has a tarsus of seven bones, a metatarsus of five, and phalanges numbering fourteen. The hand has its carpus of eight bones, its metacarpus of five bones, and fourteen phalanges. And each of these members is joined to the two bones of the limb above it. The eight bones of the carpus are arranged in two more or less complete rows running across the hand. The peculiar arrangement gives flexibility, suppleness, and peculiar strength. The long metacarpals, five in number, give the back and palm of the hand, which furnish a broad and firm surface for the apposition of the fingers in grasping and manipulating.

The muscles which move the fingers—"flexor," to bend, and "extensors," to straighten them out—are in the forearm, and pass down into tendons which are partly bound together so that it is often hard to move one finger without the others taking part in the motion. The turning of the hand on its longitudinal axis is a prominent characteristic of the human hand. No animal equals or nearly approaches man in this respect; and the muscles which enable him to *point with the index finger* are supplied to man alone. The perfect ability to place the thumb opposite each finger of the same hand is also a characteristic of the human hand. The sensitiveness of the skin of the hand to external impressions is one of the most important characteristics of this organ. This property resides in minute elevations of the skin called *papillæ*. These measure from the $\frac{1}{100}$th to the $\frac{1}{500}$th of an inch in height, and contain always a lymphatic, blood-vessels, and nerves. They are the most numerous on the palm of the hand and at the tips of the fingers, rather than at the other joints.

Hand'ball, variety of the game known as Fives, a ball being struck by the hand against a wall so that it will rebound upon the floor of the space in which the game is played. Handball is popular in the U. S. as a means of getting into good physical condition, since it requires quickness and agility as well as soundness of wind. The game is won by the player who first gets 15 or 21 aces, each ace representing a failure by his opponent to return the ball to the wall after its first rebound.

Han'del (in German, HÄNDEL), **Georg Friedrich,** 1685 1759; German composer; b. Halle, Saxony; became a violinist in the orchestra of the Hamburg Opera House, and soon was advanced to the position of leader; 1706–10, lived in Florence, Vienna, Rome, and Naples, composing operas which earned him some reputation, but little money; 1710, was made chapel master to the Elector of Hanover, afterwards King George of England; made two visits to London, where, 1711, his first opera, "Rinaldo," was produced; remained in England after 1712; pensioned by Queen Anne, and later by George I; became director of the Royal Academy of Music at the Haymarket Theater, 1720; gradually lost his noble patrons, passed twice through bankruptcy, and sank into neglect, almost oblivion, but with his oratorio, "The Messiah," his greatest work, produced at Dublin, 1742, rose to the pinnacle of fame, and before his death became a popular idol. His most remarkable works are the oratorios, "The Messiah," "Judas Maccabæus," "Israel in Egypt," and "Samson." He wrote no fewer than fifty-two operas, twenty-three oratorios, twenty-two compositions for the church, thirteen for chamber music, and three collections for organ and piano—in all, 113. He was buried in Westminster Abbey, in the Poet's Corner.

Hand'icap, so called from the drawing of lots from a cap; a means used to equalize the chances of those competing in sports so as to make the contest more even and not discourage competitors from pitting themselves against others of renowned ability. The handicap may take many forms—allowing one to start before another, or grading the weight carried by each, or allowing the weaker contestant a certain score in addition to what he makes. In team work the weaker team may be allowed extra men. A fair handicap must be founded upon the past performances of the various competitors.

Hand'writing, characters made by a person who writes with the hand. A study of writing includes the history of the signs used, or, in other words, the history of the alphabet and the history of the methods in which these signs are combined and written or given. The study of handwriting has an importance, however, aside from its historical importance, arising out of questions of forgery and the identification of the age of an instrument or document by a comparison of handwritings or a study of the materials with which it is made. For the purpose of forgery such a study is of great importance, since upon the accuracy of the information or knowledge obtainable by it frequently depend the life and fortunes of human beings. The study of handwriting may be generally divided into a physical examination of its form and appearance and an examination of the way in which it was made. These matters involve a study of the position of the hand, of the instrument used, of the writing fluid, of the paper on which the writing is made, of the age and physical condition of the writer, etc.

Hang'chow, treaty port of China and capital of the province of Cheh-kiang; near the Tsientang River and the S. terminus of the Grand Canal; has long been a principal seat of the silk manufacture and of gold and silver work; is a notable commercial, religious, and literary center; contains many magnificent temples; previous to the Taiping rebellion was one of the richest and most populous cities in

China; was captured, plundered, and impoverished by the rebels, 1861; recovered by the imperialists, 1864; pop. estimated 700,000.

Hang'ing, method of capital punishment generally adopted in England and the U. S. on account of its humanity and decency. The phrase used in sentencing one to death is that he "be hanged by the neck until he is dead." A skillful executioner will so arrange the noose that the breaking of the vertebral column makes death practically instantaneous. The violent struggles seen in some cases are purely automatic. If the neck be not broken, death is caused by compression of the windpipe and the stoppage of the circulation of blood to and from the brain. See CAPITAL PUNISHMENT.

Hanging Gar'den of Bab'ylon, one of the Seven Wonders of the ancient world; built probably by Nebuchadnezzar (604–561 B.C.) to please his wife, the Median princess Amyitis, who pined for the bolder scenery of her native country. The garden consisted of several acres of made land lifted, some say 150, others say 300, ft. above the plain, and supported by several tiers of arches.

Han'kow, river port of China; province of Hupeh; at the confluence of the Yangtse and Hau rivers; is the chief emporium for the green tea districts of the central provinces; largest ocean steamships ascend to the port; besides tea, exports include silk, rice, tobacco, beans, hemp, hides, vegetable tallow and wood oil; town was occupied and nearly ruined by the Taiping rebels; pop. abt. 800,000; with neighboring cities of Hanyang and Wuchang, abt. 1,500,000.

Han'kel, Wilhelm Gottlieb, 1814–99; German physicist; b. Ermsleben; taught in the Science High School and the university at Halle; was Prof. of Physics in the Univ. of Leipzig from 1849 till his death; is best known to science through his investigations in thermo-electricity and on the electrical properties of crystals, concerning which subjects he was an eminent authority.

Han-Kiang (hän-kē-äng'), river of China; flows through the provinces of Shensi and Hupeh, and empties into the Yangtse at Hankow; length over 1,000 m.; is navigable almost from its source; its upper valley is called the "Garden of China."

Han'ley, town of England; in Stafford; 18 m. N. of Stafford; in the district called The Potteries; inhabitants mostly engaged in the manufacture of earthenware and china. Pop. (1901) 61,519.

Han'nibal, 247–183 B.C.; Carthaginian military officer; son of the great Hamilcar Barca; lived in camp with his father after reaching the age of nine, and swore an oath of eternal enmity to Rome; assumed command of the army on the death of his uncle Hasdrubal, 221; invaded Spain and subdued all of that country S. of the Ebro; invaded Italy, 218, war against Carthage having been proclaimed by Rome, heading 90,000 foot, 12,000 horse, and 37 elephants; crossed the Rhine and the Alps, losing 76,000 by disease and the severity of the weather; defeated the Roman general Scipio on the Ticino, 218, and an army under Sempronius at the Trebia; inflicted a severe defeat on the consul Sempronius at Lake Trasimenus, 217; practically annihilated the Roman army, 86,000 strong, under the consuls Æmilius Paulus and Terrentius Varro, near Cannæ, 217.

He was finally put on the defensive by a Roman army of 200,000; suffered defeat in the routing of one of his armies at the Metaurus, 207; was compelled to leave Italy, 204, the Romans having attacked Carthage; was defeated at Zama by Scipio the Younger, 203, and barely escaped capture. Made chief magistrate of Carthage, Hannibal so far restored its power that Rome began once more to look with apprehension upon her old enemy, and demanded his surrender. Not wishing that Carthage should be disgraced, he went into voluntary exile, finally taking refuge with Prusias, King of Bithynia, who, upon a demand from Rome, decided to give him up. Hannibal took his own life by poison.

Han'no, Carthaginian navigator; set sail probably in 570 B.C. with sixty ships and a large number of colonists, coasted S. along the shores of Africa, and founded several towns; on his return set up in a temple a tablet containing an account of his voyage; of this, a Greek version, the "Periplus," is still extant.

Hanno, surnamed the GREAT; d. 202 B.C.; Carthaginian military officer; captured Hecatompylus in the first Punic War; became the leader of the aristocratic party, and the chief opponent of Hamilcar Barca and of Hannibal, his son.

Hanoi (hä-nō'ē), capital of the State of Tonking, French Indo China; on the Songka or Red River, here crossed by a railway bridge 1 m. long; about 90 m. from its mouth; is a city of large commercial importance; has manufactures of gold, silver, and filigree work, lacquerware, leather goods, mats, embroidery, and mother-of-pearl work; contains the ruins of a former extensive royal palace; has been a French possession since 1882, and the seat of government of French Indo China since 1902; pop. (1902) 150,000.

Han'over, province of Prussia; bounded N. by the German Ocean and the Elbe, E. by Mecklenburg and Prussian Saxony, S. by Hesse-Cassel and Westphalia, and W. by the Netherlands; area, 14,870 sq. m.; pop. (1905) 2,759,544; is divided into the districts of Hanover, Hildesheim, Lüneburg, Stade, Osnabrück, and Aurich, whose chief towns bear the same names. With the exception of the inhabitants of the districts bordering on the German Ocean and the Netherlands, who are of Frisian descent, the Hanoverians are Saxons. The lower classes speak Platt-Deutsch (Low German), and in the districts bordering on the Netherlands, Dutch and Frisian. The S. part of Hanover is covered with hills and low mountains, branches of the Hartz, which here seldom rise to the height of 3,000 ft.; the N.

part is a low plain. The basins of the rivers Elbe, Weser (with its affluent, the Leine), and Ems, all of which run to the German Ocean, are fertile, and the soil is well suited to agriculture.

The territory which forms the province of Hanover belonged from ancient times to the family of Brunswick-Lüneburg, and at times was divided up between the different lines of the family. In 1692 it was made an electorate; in 1814, was erected into a kingdom by the Congress of Vienna, and, 1837, at the death of William IV of England, it fell to Ernest Augustus, Duke of Cumberland, as the Salic law, which excludes heirs female, prevented Queen Victoria from inheriting it. In 1866 it was conquered by Prussia, and incorporated by that kingdom as a province.

Hanover, capital of the Prussian province of Hanover; on both sides of the Leine, which here receives the Ihme; 78 m. SE. of Bremen. The old city, irregular and partly old fashioned, is surrounded to the N. and E. by new and elegant quarters which have arisen since 1840, and, steadily increasing, group themselves around the railway station. Magnificent promenades extend to the NW. of the city, and to NE., and S. a large forest, the Eileriede, surrounds it in a semicircle. The most remarkable buildings are the museum, containing collections of art, history, and natural science; the polytechnic school, the lyceum, the former town-house, in the market place; the royal palace, overlooking the Waterloo Platz, which contains a fine arsenal and large barracks; the library; the Market Church, of the fourteenth century; and the colossal Welfenschulos, occupied by the polytechnic high school. In the vicinity of Hanover stands the palace, Herrenhausen, in an extensive park. Connected with the palace is an art gallery with a collection of antique and modern sculptures. There are manufactures of machinery, iron bridges, chemicals, paints, carpets, oilcloth, malted and other liquors, gold and silver articles, etc.

Hanover is first mentioned in history, 1163. It was at that time the residence of Henry the Lion, and with a few interruptions it has remained in the possession of the Guelphs. In 1481 it entered the Hanseatic League, and soon its commerce and wealth increased considerably. In 1837 it became the residence of the King of Hanover, and from that time it has made steady progress; especially since its annexation to Prussia it has increased both in size and splendor. Pop. (1905) 250,024.

Hanover, Trea'ty of, treaty concluded between England, France, and Russia, 1725, for mutual assistance, as opposed to the alliance between Austria and Spain.

Hanseat'ic League, or Hanse Towns, association of cities in N. Europe, formed in the thirteenth century to protect their common commercial interests. At that time commerce was subjected to rapacious exactions by sovereigns and petty lords, the maritime cities of Germany being the chief sufferers; and the rich cargoes continually passing from Genoa and Venice gave birth to swarms of pirates.

In 1239 an agreement was entered into between Hamburg, Ditmarsh, and Hadeln, to keep the Elbe and the adjacent sea free of marauders. This was the beginning of the Hanseatic League, although it is usually dated from a similar compact between Hamburg and Lübeck, 1241. Brunswick and other cities speedily joined this association. Its progress was rapid. Its diet assembled triennially, usually at Lübeck, with an extraordinary meeting decennially to renew the league.

At the height of its power the league comprised eighty-five cities, including Bergen, Berlin, Bremen, Cracow, Frankfort on the Oder, Groningen, Hamburg, Kiel, Königsberg, Revel, Riga, Stettin, Stralsund, Thorn, Zutphen, and Zwolle. They were represented by delegates. Other cities were more or less affiliated with it, but without representation, among them Amsterdam, Antwerp, Rotterdam, Bruges, Bordeaux, Marseilles, Barcelona, Cadiz, Lisbon, Leghorn, Messina, and London. The league established four great factories or depots of trade; at London, 1250; Bruges, 1252; Novgorod, 1272; and Bergen, 1278. From these centers they were able almost to monopolize the trade of Europe.

The league was at its greatest power during the fourteenth and first half of the fifteenth century. The association framed for defense had now become a confederation exercising a sovereign power, aiming at monopoly, negotiating treaties, and declaring war or peace. The discovery of America and of the passage to India via the Cape of Good Hope turned the tide of commerce into new channels, and was the finishing blow to the league. Its last meeting was held 1630. Hamburg, Lübeck, and Bremen, to which was afterwards added Frankfort on the Main, formed a new association as free Hanse towns. Napoleon, 1810, embodied them as a Hanseatic department of the French Empire. In 1813 they became free members of the German Confederation; 1866, Frankfort on the Main fell to Prussia; Bremen, Hamburg, and Lübeck are still independent members of the German Empire; and it is only since 1891 that they have relinquished the right of separate tariff legislation.

Han'sen, Peter Andreas, 1795–1874; German astronomer; b. Tondern, Schleswig; in 1823 became Schumacher's assistant at the observatory of Altona, and, 1825, was made director of the observatory of Seeberg, near Gotha, where he spent the rest of his life. His "Lunar Tables" were published in 1857 by the British Govt., and are used in the calculations of the *Nautical Almanac*.

Hansteen (hän'stän), Christopher, 1784–1813; Norwegian astronomer; b. Christiania; Prof. of Mathematics in the university there after 1814; discovered the law of magnetic force, 1821; prevailed upon the government to establish an observatory in Christiana; taught mathematics in the school of artillery; superintended the triangulation of Norway; was president of the committee for the regulation of weights and measures; published "Researches concerning the Terrestrial Magnetism," "Magnetical, Astronomical, and Meteoro-

logical Observations on a Journey through Siberia," and other works.

Han'uman. See ENTELLUS MONKEY.

Haparanda (hä-pä-rän'dä), town of Sweden; at the head of the Gulf of Bothnia; has only about 1,000 inhabitants, but its meteorological station, established 1859, is one of the most important in Europe, partly on account of its location, and partly on account of the great variations of temperature there.

Haps'burg, or Habs'burg, House of (named from the old castle of *Habsburg*, in Aargau, Switzerland. Older name *Habichtsburg*, "Hawk castle"), ancient and illustrious family, to which belongs the reigning sovereign of Austria. The founder of the house was Albert, mentioned as Count of Hapsburg, 1153. Under him and his son, Rudolf I, the family became one of the most powerful in S. Germany, and gained control of a considerable part of Switzerland. In 1233 the line parted into two branches—Hapsburg-Hapsburg and Hapsburg-Lauffenburg. The latter parted again into two lines—Hapsburg-Lauffenburg proper (extinct in the male line 1408, but still represented by the Feilding family in England), and the Hapsburg-Kyburg line (of which the last count died 1415).

The first German emperor of this family was Rudolf I, who founded the Austrian house, which from 1438 to 1806 held the German imperial crown, and since that time has held that of Austria. In Spain, Burgundy, Tuscany, and Modena, Hapsburg monarchs, but of the Spanish line, have also borne sway. The Spanish line sprung from Charles V, whose father was a son of Maximilian I, and whose mother was a daughter of Ferdinand and Isabella. When he abdicated, in 1555, he left his Austrian possessions and the imperial crown of Germany to Ferdinand I; Spain and the Netherlands to his son, Philip II. With Charles II the Spanish line of the house of Hapsburg became extinct, 1700, and the Spanish War of Succession begun, which finally left Spain to the house of Bourbon.

Hara-kiri (hä'rä-kē-rī), **or Seppuku** (sĕp-pō'kō), self-disembowelment; ceremonious form of judicial suicide permitted in feudal Japan among daimios and the military class, in order to save them the degradation of submitting to the headman's ax or the hangman's rope. In point of fact, however, it has been customary for the second or assistant—usually a kinsman or intimate friend—to strike off the head of the condemned person with his sword just at the moment the suicide plunged, or appeared to plunge, the dirk into his abdomen, or reached out to seize the dirk. Self-disembowelment has long been practiced in Japan by members of the military class who were unwilling to survive some disgrace, but it was only during the Ashikaga dynasty of Shoguns, 1336–1568, that it was recognized as a method of capital punishment, and began to be invested with elaborate formalities and ceremonies.

Ha'ran, name of a district of N. Mesopotamia with a town situated on the Belike, 50 m. N. of its influx into the Euphrates and 10 m. SE. of Edessa. The town was of great strategical importance to Assyria, and became the center of a considerable trade. Later on it was the scene of the defeat of Crassus by the Parthians, 53 B.C., and of the assassination of Caracalla by the soldiers of Macrinus, 217 A.D. It also flourished under the Arabs; but Abulfeda mentions that in his time it lay in ruins, and it has never since been rebuilt.

Harar', city of NE. Africa; S. of the Gulf of Aden, at an elevation of 5,500 ft. above the level of the sea; its population is estimated at 35,000, composed of native Harari, Gallas, Somali, and Abyssinians. The city became, 1876, a dependency of Egypt, and later came under Italian protectorate, but it was formerly the capital of a small but independent country governed by an emir. Besides in its own products and manufactures, the city carries on a brisk trade in gums, ivory, mules, slaves, etc. Pop. (est.) 30,000–40,000.

Har'bor, an inlet or indentation along the shore lines of seas or lakes that is sheltered from heavy seas and has a depth of water sufficient for navigation. *Natural harbors* are those where the conditions necessary to safety, such as depth, area, anchorage, protection from winds and waves, facility for the entering and leaving of vessels, and freedom from other agencies that tend to destroy, are found in nature. Typical natural harbors are those of New York, N. Y., Rio de Janeiro, Brazil, and San Francisco, Cal. *Artificial harbors* are those within the shore line at places where the beach is pierced or cut by the channel of a river or inlet, and advantage is taken of the flow of the tide through the channel to permit an entrance for ships. In some foreign ports where the range between the rise and fall of the tide is from 20 to 40 ft. and vessels of deep draft can readily pass in or out with the tides to the docks that are inside, the principal works required for the safety of the harbor are simply sea walls and docks, but in most cases the improvements necessary are such as will make the passage safe through the outer bar by forming a deep-water channel across its crest. Famous artificial harbors are those of London and Liverpool, England, and Calais and Havre, France.

The *outer bar* is the submerged embankment caused by the accumulation of drift from the shores, and forms the barrier at the entrance of the harbor. Its improvement is a complicated problem, and requires a careful study of all the conditions that have to do with its formation and maintenance. The physical elements that have to be considered include the amount or volume of water coming from the inside (as from a river) and its velocity, the action of the waves, winds, currents, form of basin, evaporation, character of matter, and exposure. In most cases, two piers or jetties have been recommended for the purpose of concentrating the ebb or outgoing tides on a certain section of the bar for the purpose of producing sufficient scour or dredging between them, thus keeping the channel clear and deep, but experience has shown that the volume of

water passing through the channel is reduced by these breakwaters to the amount of the flood or incoming tide, and hence the volume of the ebb movement is diminished.

In general, it has been found that there is a prevailing tendency of the drift toward the sand of the shore which is believed to be caused by the flood tide and by waves breaking at an angle to the shore line. This movement seems to afford the best solution of the problem of effecting a suitable entrance to a harbor, for the primary conditions to be fulfilled are to prevent the filling of the channel by forces from outside, or (1) to arrest the drift from the shore; (2) to concentrate the energy of the outgoing tide by a *reaction* by means of a concave breakwater extending across the bar, and located on the windward side of the channel; (3) to admit the full force of the tide so as to produce the strongest scour or dredging effect. Many instances have been cited of the successful use of jetties to maintain entrances by scour or dredging by the ebb tide, but a careful analysis of these reveals the fact that the function of such breakwaters is mainly to protect the channel from drift from the shore, while the depth is maintained by dredging. In cases where it is necessary to effect a landing without lightering (that is, by means of smaller boats) through the surf and there is no natural inlet, landing piers have been built through the breakers to deep water, thus affording both a quay for transportation of cars and a comparatively safe retreat for vessels. See BREAKWATER.

Harbor Grace (grās'), next to St. John's the most important town of Newfoundland; capital of Harbor Grace district. Its harbor is large, and the inner port is very secure. Harbor Grace has a Roman Catholic cathedral, convent, and an extensive trade. Pop. (1901) 5,184.

Har'burg, town in Hanover, Prussia; on the S. branch of the Elbe; opposite Hamburg, with which it is connected by a railway across both branches of the river; has an old castle on the river bank, large tanneries, shipyards, and manufactures of machinery, rubber goods, chemicals, jute, linseed and cocoanut oils, woolens, and linens. In 1907 the city of Hamburg voted an appropriation of $14,375,000 for the extension of the port, the work to include the development of the harbor of Harburg. Pop. (1905) 55,676.

Har'court, Sir William George Granville Venables Vernon, 1827-1904; British statesman; admitted to the bar, 1854; became Q. C., 1866; Prof. of International Law at Cambridge, 1869; Solicitor-general, 1873-74; entered Parliament for Oxford, 1868, Derby, 1885, and 1892; appointed Secretary of State for the Home Department, 1880; Chancellor of the Exchequer, 1886, and again, 1892-95; was leader of his party, 1896, and prominent in connection with the proceedings of the British S. Africa Committee, 1897; in literature is best known by his articles in the London *Times*, under the signature of "Historicus," on the Civil War in the U. S. and international law.

Har'dee, William Joseph, 1819-73; U. S. army officer; b. Savannah, Ga.; graduated at West Point, 1838; served with distinction in the Mexican War; commandant of cadets at West Point, 1856-61, when he resigned to become a brigadier general in the Confederate army; for bravery at the battle of Shiloh was promoted to major general, and placed in command of a division in Gen. Bragg's army; was in the battles of Chaplin's Hills, Murfreesboro, and Chattanooga; promoted to lieutenant general; engaged in siege and fall of Atlanta; commanded at Savannah, which place he evacuated, December 20, 1864, as he did Charleston, February 17, 1865, finally surrendering with Johnston's army at Durham Station, N. C., April 26, 1865; author of "Hardee's Tactics," adopted for use in the U. S. army and for the militia.

Har'denberg, Karl August (Prince von), 1750-1822; German statesman; b. Essenroda, Hanover; became Prussian Minister of State, 1791, and negotiated a treaty of peace with England; but by French aggressions during the war between France and England was driven into an alliance with Russia against France; after Napoleon's policy triumphed, and Prussia signed a convention with France, was compelled to resign; was recalled when war broke out with France, and was Minister of Foreign Affairs till 1807. After living for some time in exile in Russia, he, 1810, was made chancellor and carried out the plans of Stein for the reorganization of the Prussian state. He signed the Treaty of Paris, and was made a prince; after this betrayed reactionary tendencies and became displeasing to his former friends.

Hardicanute (här-dĭ-kă-nūt'), King of England; d. 1042; son of Canute by Emma, widow of Ethelred II; chosen king of the West Saxons, 1035, while Harold, his reputed half brother, ruled the rest of England. In 1036 he became King of Denmark, where he was already viceroy; was deposed as King of Wessex, 1037; made preparations for invading England, when he heard of Harold's death, 1040; was unanimously chosen King of England at the Witenagemot; had the dead body of Harold dug up and thrown into the Thames; exacted a heavy *danegeld*, and burned Worcester to the ground because it refused to pay it.

Hard'ing, Chester, 1792-1866; American portrait painter; b. Conway, Mass.; after working at many occupations, established himself as a portrait painter at St. Louis; studied in London, 1823-26; and afterwards lived in Boston and Springfield, Mass.; visiting England again, 1843. Among the many distinguished persons who sat to him were Madison, Monroe, J. Q. Adams, Wirt, Clay, Webster, Calhoun, the dukes of Norfolk, Hamilton, and Sussex, Samuel Rogers, Lord Aberdeen, and Gen. Sherman.

Harding, or Hard'yng, John, b. 1378; English chronicler; was originally an inmate of the house of Henry Percy ("Harry Hotspur"), but enlisted, after the death of Percy, under the banner of Sir Robert Umfraville, whom

he accompanied in the battle of Agincourt, 1415, and in the naval battle which the Duke of Bedford delivered the next year; his "Chronicle of England into the Reign of King Edward IV," in verse, was continued by Grafton to 1543.

Hardouin (är-dwăń'), **Jean,** 1646–1729; French Jesuit and classical scholar; b. Quimper, Bretagne; became librarian and Prof. of Dogmatic Theology at Paris; published "Conciliorum Collectio Regia Maxima," in which he endeavored to prove that none of the great Church councils before the Tridentum were historical; a commentary on the New Testament; volumes on the study of numismatics and chronology, etc., and edited Pliny's "Natural History."

Hard'war, or **Hurd'war,** ancient town in the NW. Provinces, British India; at an elevation of 1,024 ft. above the sea, on the spot where the Ganges bursts from the hill country into the plain of Hindustan. During the latter part of March and the beginning of April this place is yearly visited by more than 100,000 pilgrims, who come to make their ablutions in the holy water and pay reverence to the foot mark of Vishnu; every twelfth year is especially sacred, and at this time the number of pilgrims swells to 300,000.

Hard'wicke, Philip Yorke (first Earl of), 1690–1764; British jurist; b. Dover; admitted to the bar, 1715; elected to the House of Commons, 1719; became Solicitor General, 1720; Attorney-general, 1724; Lord Chief Justice and a peer of the realm, 1733; Lord High Chancellor, 1737.

Hard'y, Thomas, 1840– ; English novelist; b. Dorsetshire; practiced architecture in London; devoted himself to literature after 1874; published "Under the Greenwood Tree," "Far from the Madding Crowd," "The Return of the Native," "A Laodicean," "A Group of Noble Dames," "Tess of the D'Urbervilles," "The Well-beloved," "Jude the Obscure," "Wessex Poems," "The Dynasts," drama, "Poems Past and Present," and other works, almost all tales of rustic life in the W. of England.

Hare, Augustus John Cuthbert, 1834–1903; English author; b. Rome, Italy; published many works, including "Walks in Rome," "Wanderings in Spain," "Memorials of a Swiss Life," "Cities of North and Central Italy," "Walks in London," "Life and Letters of Baroness Bunsen," "Studies in Russia."

Hare, Julius Charles, 1795–1855; English clergyman and author; b. Valdagno, Italy; became vicar of Hurstmonceaux, England, 1832; Archdeacon of Lewes, 1840; Prebendary of Chichester, 1851; Chaplain to the Queen, 1853; with his brother AUGUSTUS WILLIAM wrote "Guesses at Truth"; with Thirlwall translated Niebuhr's "History of Rome"; also published "The Victory of Faith," "Memoir of John Sterling," "Vindication of Luther," etc.

Hare, Robert, 1781–1858; American chemist; b. Philadelphia, Pa.; in 1802 invented the oxyhydrogen blowpipe, which won for him the Rumford medal of the American Academy; in 1816, brought forward the calorimotor; in 1831, made successful experiments in subaqueous blasting by means of the galvanic current; other inventions include the gallows screw and several improved processes in chemistry, toxicology, and pharmacy. In 1818 he was called to the chair of Chemistry in William and Mary College, and he held the chemical professorship in the Univ. of Pennsylvania, 1818–47.

Hare, properly a rodent mammal of the family *Leporidæ* which is in the main solitary in its habits, and which constructs forms or nests on the surface of the ground, but does not have burrows; for the social and burrowing *Leporidæ* are rabbits. The females produce litters of three to six about four times a year, and this prolificness has led to the commercial exploitation of a variety known as Belgian hares. The hare has no courage and little cunning, and is protected chiefly by the acuteness of its senses, its swiftness, and the coloring of its fur, which harmonizes with its

HARE (*Lepus Americanus*).

surroundings. With the exception of the calling hares (of which the U. S. have one species, the little chief hare of the Rocky Mountains) the hares and rabbits are all of the genus *Lepus*. Of more than forty known species, nearly half are N. American. The more important are the common gray rabbit, extensively taken as food by traps, snares, and firearms; the great white hare, the jackass rabbits of the Far West, and the water hares of the South, good swimmers and inhabitants of swamps. The most common of the European hares is the *L. timidus*, extensively coursed by greyhounds and pursued by harriers and beagles. This species is widely distributed, being found not only throughout the greater part of Europe, but in the N. portions of Asia and N. America. The Arctic hare, which in winter is snowy white, except the tips of the ears, which are black, is merely a variety of this animal, as is also the varying hare of Europe and Asia, which turns more or less white in winter. See RABBIT.

Hare'bell. See BLUEBELL.

Ha'rem, female members and children of a Mussulman family; also, and more commonly,

their apartment in the house. This is entirely distinct from the men's apartment, which is called selamlik (place of salutation). Into the harem no man can enter save the master, nor he till after giving warning of his approach, that any lady not of his household may have time to withdraw. When the master has more than one wife (something comparatively rare, though four wives are allowed each Mussulman) he must provide for each an apartment entirely distinct and complete.

Harfleur (är-flĕr'), town of Seine-Inférieure, France; near the Seine; 4 m. NE. of Havre, and 4 m. SW. of Honfleur, with which it is occasionally confounded; was once a bulwark against foreign invasion and an important port, but deposits brought down by the Lézarde have spoiled the harbor; has a Gothic church with a famous belfry, a chateau with a beautiful park, and delightful promenades; Henry V of England captured Harfleur, 1415; the English were expelled, 1433, but subsequently reoccupied the town till 1450; now chiefly known for its manufacture of faïence and metallurgical articles. Pop. (1901) 2,612.

Har'graves, Edmund Hammond, 1816–91; discoverer of the gold fields of Australia; b. Gosport, England; visited almost every part of the world as a sailor; settled in Australia, 1834; went to California, 1849, where he worked in the gold diggings; returned to Australia, 1851, and made the discovery of gold near Bathurst on the Macquarie River, New South Wales; was appointed commissioner of crown lands, and the Legislative Council of New South Wales voted him £10,000; published "Australia and its Gold Fields."

Hargreaves, James, d. 1778; English inventor; b. Stanhill; was an unlettered hand spinner and weaver; invented the carding machine as a substitute for the use of hand cards, 1760, and of the spinning jenny, 1764–1767; removed to Nottingham, 1778, and set up as a machine spinner, but never had much success; obtained a patent on the jenny, but it was set aside by the courts, and he died a poor man.

Häring (hä'rĭng), **Wilhelm** (pen name WILIBALD ALEXIS), 1797–1871; German novelist; b. Breslau; became especially known by his romance "Walladmor," written in compliance with a wager to produce an imitation of Walter Scott's works.

Harivansa (hä-rĭ-vän'shä), kind of epic written in Sanskrit, regarded as a supplement to the "Mahâbhârata"; treats of Vishnu in his avatar as Krishna, of cosmogony, and of ancient history.

Harleian (här'lē-ăn) **Collec'tion,** mass of MSS. collected by Robert Harley, Earl of Oxford, 1661–1724, and by Edward, his son. In 1723 it was purchased by the British Govt. for £10,000 and the documents are now in the British Museum. There are some 8,000 MSS., many of them of very great value.

Har'lem Riv'er, tidal channel or strait which with Spuyten Duyvil Creek separates Manhattan Island from the mainland, and connects the Hudson River with the channel called East River, which separates Manhattan from Long Island; begins at Kingsbridge, and extends in a generally SE. direction for 7 m. to Randall's Island, near Hell Gate. In June, 1895, this whole channel was opened as a ship canal.

Harlequin (här'lē-kĭn), pantomimic character, transplanted from the Italian stage to other countries, and traceable to the earliest times. The principal inventor of the pantomimes introducing Harlequin was Ruzzante, abt. 1530. Rich, in the eighteenth century, introduced Harlequin on the English stage. The German Hanswurst, driven from the stage in the eighteenth century, was as noted for his clumsiness as the Italian Harlequin for his elasticity, or the French for his wit, and the Spanish for his drollery.

Har'ley, Robert. See OXFORD, EARL OF.

Har'mar, Josiah, 1753–1813; American army officer; b. Philadelphia in 1753; 1776 was made captain of the First Pennsylvania Regiment, and lieutenant colonel, 1777, which command he retained until the close of the Revolution, serving with Washington in his campaigns, 1778–80; in the South with Greene, 1781–82; brevet colonel First U. S. Regiment, 1783; 1784 bore the ratification of the definitive treaty to France; in the following year was present as Indian agent at the treaty at Fort Mackintosh; brevet brigadier general by resolution of Congress, 1787; and general in chief of the army, 1789–92, when he resigned.

Harmat'tan, dry, hot wind, blowing from the interior of Africa toward the Atlantic in December, January, and February. It is the same in its character as the *sirocco* of Italy and the *kamsin* of Egypt.

Harmo'dius and Aristogiton (ăr-ĭs-tō-jĭ'tŭn), two Athenians, commonly reckoned among the martyrs of liberty. Aristogiton had conceived a passion for Harmodius, a beautiful youth, in which Hipparchus, one of the Pisistratidæ, was his rival. Stung by jealousy, in conjunction with Harmodius and others, he formed a conspiracy to destroy the tyrant during the Panathenaic festival. The plot succeeded; but Harmodius was slain by the guards, and Aristogiton arrested, 514 B.C., and put to the torture by Hippias, the brother of Hipparchus, who put to death his own best friends, implicated by the answers of Aristogiton. On the expulsion of Hippias, 510, the Athenians erected statues to Harmodius and Aristogiton, and decreed that no slave should bear their names.

Harmo'nia, nymph of the spot on which Thebes was founded, a daughter of Ares and Aphrodite, and sister of the dragon which Cadmus slew. She herself was the prize that awaited Cadmus in case he should prove successful in his contest with the dragon. Their marriage took place on the spot which afterwards became the Cadmea of Thebes. All the gods came to the marriage, each bringing a gift, while Apollo, the Muses, and the Graces made the marriage music.

Harmon'ica, musical instrument, in which the tone is produced by the vibration of bell-shaped glasses, caused by friction from the moistened finger. These were also known as "musical glasses." Musicians regard it only as a musical curiosity or toy. The name harmonica is also applied to a reed instrument played by the breath, *i.e.*, a mouth organ, usually, also, a toy.

Harmon'ic Mo'tion, in mechanics, the projection on any diameter of a point moving uniformly in a circle. If a planet or satellite, moving uniformly in a circular orbit about its primary, be viewed from a very distant position in the plane of its orbit, it will appear to move backward and forward in a straight line with a simple harmonic motion—*e.g.*, the satellites of Jupiter seen from the earth. Such motion as that described is approximately that of the simplest species of vibrations of a sounding body, a tuning fork or piano wire; it is also that of the various media in which waves of sound, light, heat, etc., are propagated, and it enters extensively into the theories of these phenomena, as well as into those of astronomy and mechanics. The *amplitude* is the range on one side or the other of the middle point of the course. The *argument* is the circular arc described by the projected point, and measured from any arbitrary fixed point. It is proportional, of course, to the time measured from period of passage through that arbitrary point. The distance of a point moving with simple harmonic motion from the middle of its course is a *simple harmonic function of the time*, the argument of which has just been defined. The *period* of such motion is the time of a complete course to and fro. The *phase* at any instant is the fraction of the whole period elapsed since the moving point passed through its middle position in a positive direction. The *epoch* is the time from the era of reckoning to the reaching of greatest elongation, in the direction reckoned as positive, from its mean position or middle of the course.

Harmon'ics, in music, certain secondary or accessory sounds which are given out by sonorous bodies, besides the principal sound, and different from it, but bearing also to such sound a determinate harmonic relation. It is probable that every well-defined sound is the generator or root of several other sounds, which are more or less audible. A single string produces not only its own proper sound, but also its octave, twelfth, fifteenth, seventeenth, nineteenth, etc., or the sounds belonging to one half, one third, one fourth, one fifth, one sixth, etc., of its length. These secondary sounds, in combination with the principal one, are found to be the elements of the perfect *major triad* —*i.e.*, the root or fundamental tone—with its third and fifth, or their octaves and double octaves. A musical ear readily detects several of these in the sound of a large church bell, and these harmonics are more or less perfect in proportion as the bell is regularly formed. Sounding bodies not only give out primary tones and accompanying harmonics from their own substance, but also, under certain conditions, induce similar sounds in other bodies within reach of their vibrations. A string vibrating at a certain rate—*e.g.*, 120 times in a second—will by "sympathy" cause equivalent vibrations in another contiguous string of the same length, thickness, and tension, and will also excite the more rapid vibrations of strings tuned to sound its octaves, thirds, and fifths; the vibrations or undulations on which sound depends meeting, coalescing, or touching each other at certain regular distances, longer or shorter, and thus producing the harmonic intervals just named. A long-continued note on an open string of a violin will thus cause vibrations in the corresponding string of another violin hanging against the wall, and the harmonics of the open string may be made to prevail entirely over the fundamental note, by softly touching the open string at its center or other appropriate part. A tuning fork forcibly struck, and set on the sounding board of a piano, will occasion all the strings in harmonic relation with it to vibrate in sympathy. The jarring of window sashes, the jingling of glass vessels, and the rattling of loose articles of furniture, when musical notes *of a certain pitch* (and not otherwise) are sounded, are facts easily explainable on the same principle. Telegraph wires also, during a brisk wind, often give out harmonic tones, though the proper sound of the wire is inaudible.

Harmon'ic Stops, in a large organ, certain stops consisting of two, three, four, or more ranks of pipes, tuned in octaves, double octaves, and double or triple thirds and fifths above the natural pitch of the keys. Among these are the cornet, sesquialtera, mixture, and furniture; but, comprehensively, the term may also include those stops having only a single rank of pipes, which are tuned in thirds, fifths, and their octaves above the pitch represented on the keyboard. These latter are known as "mutation stops," among which are the quint, twelfth, tierce, larigot, and several others. The use of these stops is not only to add power to the "foundation stops" of the instrument—*i.e.*, those which give the primary or *true* sound and its octaves—but also to produce clearness, variety, and greater or less degrees of brilliance, according to the character and requirements of the music under performance. Hence these stops are found in largest number on the keyboard or "manual" designated as the "great organ," though several of them have place also on the "choir organ," the "swell," and the "pedal organ."

Har'monists, followers of George Rapp (1770–1847), a German, of Würtemberg, who, believing that he was divinely called to restore Christianity to its primitive purity, organized a community in which goods were held in common. Disturbed by the authorities, they removed, 1803, to the U. S.; settled, 1805, at Harmony, Butler Co., Pa., and removed, 1815, to New Harmony, Ind., which, 1824, they sold to Robert Owen. They then removed to Economy, Pa., 17 m. NW. of Pittsburg. They own 3,500 acres of land, and have important manufactures. They do not marry. They interpret the Scriptures literally, believe that the millennium is near at hand, and that all mankind

will ultimately be saved. They observe Christmas, Good Friday, Easter, and Pentecost. They decreased rapidly in numbers, having, according to the census of 1890, about 250 members.

Har'mony, in music, the union of two or more melodies, or the combination of several tones in one *simultaneous* utterance in accordance with certain regulating principles, in distinction from melody, which consists of a varied *succession* of single or simple tones. Harmony, as now understood and practiced, is a science of comparatively modern times, having risen from its rudest form to its present perfection within the last three or four centuries. There is no evidence that the ancients had any acquaintance with the laws indicating the relations of combined musical sounds, or any conception of the rich and beautiful effects resulting from those combinations under scientific and æsthetic treatment. This science made little advance till the invention of the more perfect classes of instruments, such as the keyed organ and the precursors of the harpsichord and piano. When these instruments came into existence it became possible, for the first time, to reduce to experiment and proof all kinds of musical combinations, and to deduce from actual test some fundamental rules on which chords might be classified, and their progressions determined in an orderly and scientific manner. See COUNTERPOINT; MELODY; MUSIC.

Harmony of the Spheres, kind of music which the ancients imagined was produced by the motions of the heavenly bodies. This sound, said they, we do not hear, because we have always heard it, and cannot contrast it with absolute silence, of which we know nothing. Others thought the sound too powerful for our hearing, or that our senses are too gross to perceive it.

Harms, Claus, 1778–1855; German theologian; b. Fahrstedt, Holstein; became chief pastor at Kiel, 1835, and councilor of the Supreme Consistory, 1842; celebrated the jubilee of the Reformation, 1817, by propounding ninety-five new theses, which, together with his theological works, gave the first strong impulse to a great revival of the orthodox Lutheran theology in Germany.

Har'nack, Theodosius, 1817–89; Russian theologian; b. St. Petersburg; Prof. of Theology at Dorpat, 1848–53, at Erlangen till 1866, at Dorpat till retired, 1873; chief works, "Practical Theology" and "Questions and Explanations to Accompany Luther's Small Catechism."

Har'nett, Cornelius, 1723–81; American patriot; b. probably in N. Carolina; was one of the first to denounce the Stamp Act and kindred measures; member of the Provincial Assembly, 1770–71; president Provincial Council, 1775; drew up the instructions to the N. Carolina delegates in the Continental Congress, 1776; afterwards as member of that body signed the Articles of Confederation; died a prisoner of war.

Har'old, name of two kings of England, who follow: HAROLD I (surnamed HAREFOOT, from his swiftness), d. 1040; reputed son of Canute by Ælgifa of Northampton; was chosen Canute's successor by the Danish party, 1035, and began to reign N. of the Thames; but Hardicanute, the late king's recognized heir, was preferred by the English party. Hardicanute was chosen King of Wessex, and Emma, his mother, was his regent, he being then absent in Denmark. Harold soon rid the kingdom of the Anglo-Saxon princes (Æthelings), and, 1037, was chosen King of all England. HAROLD II, d. 1066; last sovereign of the Anglo-Saxon race; second son of Godwin, the great earl of the W. Saxons, by Gytha, a Danish lady; assisted his father in his quarrels with Edward the Confessor, with whom he became reconciled, 1052; with Tostig, his brother, conquered Wales, 1063; was shipwrecked at the mouth of the Somme, Normandy, made prisoner, and compelled to swear to give support to Duke William's claim to the English crown, 1065; caused himself to be proclaimed king, and was crowned January 10, 1066; defeated and slew Harold Hardrada, who supported the claims of Tostig, Harold's brother, at the battle of Stamford Bridge, September 25, 1066; fought William the Conqueror at the bloody battle of Hastings, and was killed there.

Harold, name of several kings of Norway, most important of whom were: HAROLD (or HARALD) I HAARFAGER, d. 933; first King of Norway in the historic period. According to the story he loved Gyda, a jarl's daughter, who refused to marry him until he had conquered all Norway; and accordingly, 865, he took a vow never to comb or cut his hair till all the jarls submitted to his sway. His great sea fight at Hafursfiord (885) released him from his vow; was succeeded by Eric I. HAROLD (or HARALD III) HARDRADA, abt. 1016–66; became a knight-errant in the East; served in the Byzantine armies, 1038–40, and was distinguished by his exploits in Sicily and at Jerusalem; became sole King of Norway on the death of Magnus the Good, his nephew, 1047; invaded England, 1066, to avenge the supposed wrongs of Tostig, brother to Harold II of England; gained the battle of Fulford (September 20th), but was defeated and killed in the battle of Stamford Bridge.

Haroun al Raschid (hä-rōn' äl räsh'id), Arabian, AARON THE JUST, abt. 765–809; Caliph of Bagdad, the fifth of the Abbasides; son of the Caliph Mohammed Mahdi by a slave woman; b. Rei; invaded the Greek Empire, 781; encamped opposite Constantinople, and compelled the Empress Irene to pay yearly 70,000 dinars in gold; succeeded Mousa al Hadi, his brother, 786; raised the caliphate to its greatest splendor, chiefly by the aid of Zahya and Jaafer the Barmecides, whom he treacherously murdered, 803; sent an embassy with presents to Charlemagne, probably 801; engaged in fierce wars with the Byzantines; made Bagdad a center of learning, commerce, and industry; died in Khorassan; hero of many popular tales in the "Arabian Nights."

Harp, triangular musical instrument with parallel strings, played with the thumb and fingers. Its origin cannot be ascertained; but it was familiar to the Hebrews, and was known to the Egyptians probably as early as 2000 B.C. To the Greeks and Romans it seems to have been unknown. It was common to the N. races of Europe in the early centuries of the Christian era, and in Ireland and in Wales harps of many strings and of elegant form were in use as early as the fifth and sixth centuries. The introduction of pedals and the improvements of Sébastien Érard have greatly added to the power and sweetness of the modern harp.

TRIANGULAR HARPS.

1. Ancient Egyptian harp, from instrument in Egyptian Museum, Florence. 2. Ancient Egyptian harp (Wilkinson). 3. Ancient Egyptian harp (Wilkinson). 4. Persian *Chang* (from Persian MS. 410 years old)—Lane's "Arabian Nights."

VARIOUS FORMS OF EGYPTIAN HARPS (ROSELLINI).

1 and 3. Portable harps for single use. 2. Orchestral harp. 4. From painting at Thebes, on tomb of Rameses III.

Har'palus, treasurer of Alexander the Great. In 324 B.C. he took flight with a large amount of embezzled treasure, which the Athenians, to whom he fled for refuge, forced him to deposit in the Parthenon in trust for Alexander. The discrepancy between the sum as stated by Harpalus and the sum actually deposited led to investigation, and the name of Demosthenes headed the list of the nine who were charged with having received bribes. Harpalus meantime had escaped from the prison in which he had been confined and went with some troops to Crete, where he was murdered.

Har'per, James, 1795–1869; American publisher; b. Newtown, Long Island, N. Y.; was the son of a farmer, and removed with his brother John (1797–1875) to New York city, where the brothers learned the printer's trade, founded the firm of J. & J. Harper, printed for a time for booksellers, and, establishing themselves as printers and publishers, brought out their first publication, an edition of "Locke on the Human Understanding," 1818. Their brothers, Joseph Wesley (1801–70) and Fletcher (1806–77) learned the business with them, and were admitted to the firm, the name of which was changed to Harper & Brothers, 1832. James Harper was elected Mayor of New York, 1844. The extensive plant of the firm on Cliff and Pearl streets was destroyed by fire, 1853, and the present establishment occupies the site of the former one. Descendants of the founders carried on the business till 1895, when the firm became a corporation.

Harper, William Rainey, 1856–1906; American educator; b. New Concord, Ohio; Prof. of Hebrew and the Cognate Languages, Baptist Union Theological Seminary, Morgan Park, Ill., 1879–86; Principal of the Chautauqua College of Liberal Arts, 1885–91; Prof. of the Semitic Languages, Yale, 1886–91; Woolsey Prof. of Biblical Literature, Yale, 1889–91; president of the Univ. of Chicago and head Prof. of the Semitic Languages and Literatures in that institution from 1891 till his death; the chief exponent of the inductive system of language study, and edited numerous text-books on that principle.

Harper's Fer'ry, town of Jefferson Co., W. Va.; on the Potomac River, at the mouth of the Shenandoah, where the united streams force their passage through the Blue Ridge; 55 m. NW. of Washington; is built around the base of a hill, and is connected by a bridge with the opposite (Maryland) bank of the Potomac. Before the Civil War it was the seat of an

extensive and important U. S. armory and arsenal. On October 16, 1859, John Brown, at the head of a small party of Abolitionists, seized the town. (See BROWN, JOHN.) On April 18, 1861, the arsenal was seized by a party of insurgents, and the workshops were partly burned. The place was afterwards alternately in the hands of both parties. On September 15, 1862, just previous to the battle of Antietam, it was taken by the Confederates under "Stonewall" Jackson, who captured abt. 11,000 prisoners, 73 guns, 13,000 small arms, and a considerable amount of stores. Pop. (1900) 896.

Har'pies, in Greek mythology, fabulous monsters, daughters of Neptune and Earth, or, according to Hesiod (who calls them Aëllo and Ocypete), of Thaumas and Electra. By Homer they are represented merely as personified storm winds, who were believed to have carried off any person who had suddenly disappeared; by Hesiod as fair-haired and winged maidens, who surpass the winds in swiftness; and by later writers as disgusting monsters, with heads like maidens, faces pale with hunger, and claws like those of birds. They ministered to the gods as the executors of vengeance. They were two or three, and dwelt in the Strophadæan Isles, in the Ionian Sea.

HARPY.

Harpocrates (här-pŏc'rā-tēz). See HORUS.

Harpocration (här-pō-crā'shĭ-ōn), **Valerius,** Greek philologist of Alexandria, in the second or fourth century A.D.; author of a valuable lexicon, still extant, to the works of the Attic orators.

Harpoot (här-pōt'). See KHARPUT.

Harp Seal, popular name of a species of hair seal, so called from the markings on its back; inhabits the coasts of Greenland, Labrador, and Newfoundland; is also found in the N. of Europe and of Asia, and is of great commercial importance; is the most extensively caught of all the seals sought in the Newfoundland fisheries, many steamers as well as sailing vessels being employed in its pursuit; yields great quantities of excellent oil, and its skin is valuable.

Harp'sichord, keyed musical instrument, which preceded the piano; was substantially a horizontal harp, played by means of keys. The best instruments had a compass of five octaves. The harpsichord was in use as early as the fifteenth century, and gradually superseded the spinet and virginals, itself later giving way before the piano.

Har'py. See HARPIES.

Harpy Ea'gle, large and powerful eagle (*Thrasaëtus harpyia*) of tropical America, of very rare occurrence in the S. parts of the U. S.; is dark gray above, barred with black, wings dark, head and under parts, except a dark band across the breast, white; head crested. The harpy is over 3½ ft. long, the beak is strong, feet and the talons enormous. Judged by its build, this eagle is the most powerful of the birds of prey.

Har'rier, variety of the hound (*Canis sagax*), used in hare hunting. The modern improved harrier is a miniature fox hound, with

HARRIER.

shorter ears, an acute sense of smell, great speed, and a height of about 18 in. The old harrier was larger, slower, and more inclined to dwell on the scent.

Harrier, general name for the hawks of the genus *Circus*. Of some fifteen species, only one (*C. hudsonious*), the marsh hawk, is a native of the U. S. Like the goshawks, the harriers fly along the ground in search of prey. In this genus feathers radiate from the eyes, giving the bird a rather owllike appearance. See MARSH HAWK.

Har'rington, James, 1611–77; English political writer; b. Upton; was groom of the bedchamber to Charles I during his confinement, and after his death composed his great work, "Oceana," a kind of political romance describing an ideal republic, which was seized by order of Cromwell while in the press; but he was finally permitted to publish it, 1656, and even to dedicate it to Cromwell himself. In 1659 Harrington published an abridgment of it entitled "The Art of Lawgiving," and instituted a political club called the "Rota," which was dissolved, 1660. He was arrested on a charge of treason, 1661, but was soon liberated; also published "The Grounds and Reasons of Monarchy Considered" "The Prerogative of Popular Government," "A Model of Popular Government," etc.

Har'riot, Thomas, 1560–1621; English mathematician, b. Oxford; accompanied Sir Walter Raleigh's expedition to Virginia, 1584, and wrote "A Brief and True Report of the Newfound Land of Virginia." His mathematical researches were published, 1631, under the title "Artis Analyticæ Praxis ad Æquationes Algebraicas Resolvendas." He is believed to have discovered the satellites of Jupiter and the spots on the sun independently of Galileo.

Har'ris, Howell, 1713–73; chief founder of Calvinistic Methodism in Wales; b. Trevecca, Wales; like Wesley and Whitefield, a Churchman, he received little or no sympathy from the clergy, but the two great evangelists heartily recognized him. In a few years he had formed no less than 300 societies. Wesley and Whitefield frequently traversed the principality in his company, preaching daily. Wesley describes Harris as a "powerful orator." Harris raised and commanded a regiment, mostly of his own people, during the French War, when the invasion of England was expected.

Harris, Joel Chandler, 1848–1908; American journalist and author; b. Eatonton, Ga.; learned the printer's trade and was connected with various newspapers in his native state; held an editorial position on the Atlanta *Constitution* after 1876. To that paper he contributed his very successful studies in the folk lore of the American Negro, published collectively, 1880, as "Uncle Remus; his Songs and his Sayings." This was followed by "Mingo and Other Sketches," "Nights with Uncle Remus," "Daddy Jake, the Runaway," "On the Wing of Occasion," "The Tar Baby Story," "Told by Uncle Remus."

Harris, Samuel, 1724–94; the "apostle of Virginia"; b. Hanover Co., Va.; became a colonel of militia in Pittsylvania Co., and held important public offices; 1769 was ordained a Baptist minister, having for years zealously preached in the Baptist churches with great power; gave a large share of his property to charitable causes, and underwent much persecution from the then Established Church of Virginia; 1774 was ordained an "apostle" by the General Association of Separate Baptists.

Harris, William Torrey, 1835–1909; American educator; b. Killingly, Conn.; superintendent of public schools in St. Louis, Mo., 1867–80; removed to Concord, Mass., and became a lecturer at the School of Philosophy; represented U. S. Bureau of Education at International Congress of Educators, Brussels, 1880, and at the Paris Exposition of 1889; U. S. Commissioner of Education, 1889–1906; editor of "Appleton's School Readers" and "Appleton's Educational Series"; associate editor of "Johnson's Universal Cyclopædia" in charge of department of philosophy, 1892–95; established *The Journal of Speculative Philosophy*, 1867, and was for many years its editor; chief editor "Webster's International Dictionary" after 1900; besides his official educational reports, highly esteemed at home and abroad, published a large number of works on philosophical and sociological subjects.

Har'risburg, capital of the State of Pennsylvania and of Dauphin Co.; on the Susquehanna River and the Pennsylvania Canal; 105 m. W. of Philadelphia; has four bridges across the river, each over 1 m. long, and direct railroad connection with the coal and iron regions; is chiefly engaged in the manufacture of iron and steel, machinery, boilers, railroad cars, malt liquors, leather, brick, burial caskets, carriages and wagons, marbleized slate, galvanized iron cornices, and hydraulic cement; and has a large trade in lumber, butter, hay, and other farm products. The state capitol, located in a park of more than fifteen acres, was burned down 1897, and replaced by a new $9,000,000 structure 1906. This park also contains a monument to the memory of the Pennsylvania soldiers who fell in the Mexican War. Other objects of interest are the state arsenal, county courthouse, insane asylum, Home of the Friendless, Children's Industrial Home, Harrisburg Academy, St. Genevieve's Academy, Young Ladies' Seminary, Harrisburg Cemetery, Harris Park, and several hospitals. The site of the city was settled by John Harris abt. 1726; became known as Harris's Ferry, 1755; was laid out as the town of Louisburg, 1785; incorporated as the borough of Harrisburg, 1791; and made the state capital, 1812. Pop. (1906) 55,735.

Har'rison, Benjamin, abt. 1740–91; a signer of the Declaration of Independence; b. Berkeley, Va.; Speaker of the House of Burgesses, 1764, and again, 1777–82; member of the General Congress, 1774–77, and Governor of Virginia, 1782–85; was brother of Gen. Charles Harrison, a Revolutionary officer, and father of Pres. William Henry Harrison.

Harrison, Benjamin, 1833–1901; twenty-third President of the U. S.; b. North Bend, Ohio; grandson of William Henry Harrison, ninth President; removed to Indianapolis, Ind., 1854, and practiced law; was elected reporter of the decisions of the Supreme Court of the state, 1860; became colonel of the Seventieth Indiana Volunteers, 1862; took part in the campaign of Sherman against Johnston, 1864; served with distinction at Peach Tree Creek; had charge of a brigade at the battle of Nashville; was brevetted brigadier general, 1865; was again reporter of the Supreme Court, 1865–69; defeated for Governor of Indiana, 1876; member of the Mississippi River Commission, 1879; declined a portfolio in Garfield's Cabinet; U. S. Senator, 1881–87; became a strong advocate of protective duties, civil service reform, and the rehabilitation of the navy; was elected President, 1888, on a protective-tariff platform, receiving 233 electoral votes, against 168 for Grover Cleveland, Democrat; was again a candidate, 1902, but received only 145 electoral votes against 276 for Cleveland.

Harrison, Frederic, 1831– ; English author; b. London; called to the bar, 1858; member of the Commission on Trades Unions, 1867–69; Secretary to the Royal Commission for the Digest of the Law, 1869–70; and from 1877 to 1889 was Prof. of Jurisprudence and International Law at Lincoln's Inn Hall, 1877–89; in philosophy is a follower of Comte, and was one of the founders of the Positive school in England, 1870; chief works: "The Meaning of History," "Order and Progress," "The Choice of Books," "Oliver Cromwell," "Lectures on Education," "William the Silent."

Harrison, John, 1693–1776; English inventor; b. Faulby, York; produced a new escapement for clocks and watches and a compensa-

tion (gridiron) pendulum, 1725; invented the nautical chronometer, 1736, and perfected it, 1759; received in consequence, 1767, a prize of £20,000 offered, 1714, for the invention of means by which mariners could tell their longitude within 30 m.

Harrison, William Henry, 1773–1841; ninth President of the U. S.; b. Berkeley, Va.; became an ensign in the army, 1791, and a lieutenant on Wayne's staff, 1792; was made captain and commandant of Fort Washington, now Cincinnati, Ohio, 1797. He was Secretary of the Northwest Territory, 1798–99; elected to Congress, 1799; Governor of Indiana Territory and Superintendent of Indian Affairs, 1801–13; concluded thirteen important treaties and gained the battle of Tippecanoe, November 7, 1811; became major general of Kentucky militia and brigadier general in the army, with command of the NW. frontier; was made major general, 1813. He won renown by the defense of Fort Meigs and the battle of the Thames, October 5, 1813; left the army, 1814, and was employed in Indian affairs; member of Congress from Ohio, 1816–19; State Senator, 1819–21; U. S. Senator, 1825–28; presidential elector, 1821 and 1825; minister to Colombia, 1828–29. He was elected President by the Whigs, 1840, receiving 234 electoral votes against 60 for Martin Van Buren, Democrat. Died thirty-one days after his inauguration.

Har'row, town and parish of Middlesex, England; 12 m. NW. of London; chiefly famous for its school, founded 1571, as a free school for poor boys, now one of the most exclusive of English classical schools; usually has about 600 students. Pop. (1901) 10,220.

Hart, James McDougal, 1828–1901; American landscape painter; b. Kilmarnock, Scotland; was taken to the U. S. when three years of age; studied painting with his brother, William Hart, and later in Düsseldorf under Schirmer; National Academician, 1859. His works include "Drove at the Ford," in the Corcoran Gallery, Washington, and "Adirondacks," in the Walters collection, Baltimore.

Hart, Joel T., 1810–77; American sculptor; b. Clarke Co., Ky. While working, 1830, at Lexington, Ky., as a stone cutter, began modeling in clay, and soon won reputation. His statue of Henry Clay, which he began in 1846, owing to a shipwreck and other causes of delay, was not set up for many years, is in Richmond, Va. The "Angelina," "Woman Triumphant" (in the courthouse at Louisville, Ky.), and "Il Penseroso" are among his best works. He made many portrait busts, and invented a mechanical contrivance for modeling heads from life; he died at Florence, Italy; remains removed to Lexington, Ky., 1884, where the state erected a monument over them.

Hart, John, 1708–80; American patriot; b. Hopewell, N. J.; served in the Continental Congresses of 1774, 1775, and 1776; signed the Declaration of Independence; was chairman of the New Jersey Council of Safety, 1777–78.

Hart, William, 1823–94; American landscape and cattle painter; b. Paisley, Scotland; brother of James McD. Hart; self-taught; removed to the U. S. in boyhood; studied in Scotland, 1849–52; National Academician, 1858; member American Water Color Society, president, 1870–73; notable works, "Autumn in the Woods of Maine," "Twilight on the Brook," "The Golden Hour," "Cattle Scenes."

Hart. See STAG.

Harte, Francis Bret, 1839–1902; American novelist and poet; b. Albany, N. Y.; went to California, 1856; was a coal dealer, a teacher, a typesetter; became a member of the staff of *The Californian*, to which he contributed his "Condensed Novels." He was secretary of the U. S. mint in San Francisco, 1864–70; removed to New York, 1871; was U. S. consul at Crefeld, Germany, 1878–80, and at Glasgow, Scotland, 1880–85; then settled in London. His works include the poems "The Society upon the Stanislaw," "John Burns of Gettysburg," and "The Heathen Chinee"; several volumes of poems; "The Luck of Roaring Camp," "The Outcasts of Poker Flat," "Tales of the Argonauts," "Gabriel Conroy," "A Phyllis of the Sierras," "In the Carquinez Woods," "Under the Redwoods."

Hart'ford, capital of the State of Connecticut and of Hartford Co.; port of entry, and important railway and commercial center; on the Connecticut River; 36 m. NE. of New Haven; is especially noted for its large number of life, fire, and other insurance companies. Its most noticeable building is the state capitol, completed, 1880, at a cost of over $3,000,000, and having on its bridge approach over Park River a handsome soldiers' memorial arch. Other important buildings are Trinity College, with statue of Bishop Brownell; Hartford Congregational Theological Seminary; American Asylum for the Deaf, the oldest institution of its kind in the U. S.; Retreat for the Insane; Old People's Home; Wadsworth Athenæum, containing the Connecticut Historical Society, Public Library, Watkinson Reference Library, and Watkinson Juvenile Asylum; old state house, now used as a city hall; St. Joseph's Cathedral (Roman Catholic); and the Colt factories. According to the U. S. Census for 1905 the city had 340 factory system manufacturing plants, operated on a capital of $28,358,583, and yielding products valued at $25,973,651. The manufactured articles include firearms, steam boilers, steam engines, machinery, nails, screws, pins, bicycles, carriages, automobiles, electric vehicles, rubber goods, belting, typewriters, furniture, pumps, hosiery and knit goods, subscription books, and envelopes. Hartford was settled, 1635, by emigrants from Newtown (now Cambridge, Mass.), reënforced, 1636, by a company constituting the Puritan Church at Newtown, led by its pastor, Rev. Thomas Hooker. In 1639 the planters of Hartford, Windsor, and Wethersfield adopted at Hartford a written constitution, the first framed in America. In 1687 Sir Edmund Andros, Governor General of New England, made at Hartford an unsuccessful attempt to seize the charter granted to

Connecticut, 1662. (See CHARTER OAK.) Hartford was the sole capital of the colony of Connecticut until 1701. From that year until 1873 New Haven was one of the capitals. In 1873 a constitutional amendment was adopted making Hartford the sole capital again. Pop. (1906) est. 95,822.

Hartford Conven'tion, political convention held at Hartford, Conn., between December 15, 1814, and January 5, 1815, for the purpose of considering the interests of the New England states in relation to the war with Great Britain. It consisted of twelve delegates from Massachusetts, seven from Connecticut, three from Rhode Island, two from New Hampshire, and one from Vermont. The president was George Cabot, of Massachusetts, and the secretary Theodore Dwight, of Connecticut. The convention sat in secret session for three weeks, and then issued a report to the legislatures of the states represented. This document, alleging various violations of the Federal Constitution by the administration, as in the power over the militia claimed for the General Government, and in the filling up of the ranks of the regular army by conscription, proposed several amendments to that instrument, among which were: making the President ineligible for a second term; limiting embargoes to sixty days; and requiring a two-thirds vote in Congress to admit new states, to interdict commercial intercourse, to declare war, or to authorize hostilities, except in cases of invasion.

Congress, then in session, passed an act regulating the employment of state troops by the Federal Government in a satisfactory manner. The other questions were practically set at rest by the speedy close of the war. The holding of the Hartford convention and its supposed treasonable designs caused a great outcry from the Democratic Party, excited much alarm and apprehension at Washington, and formed one of the chief causes which destroyed the Federal Party; but it is now almost universally conceded that the convention was guiltless of any designs which could justly be considered treasonable.

Har'tington, Spencer Compton Cavendish (Marquis of), now DUKE OF DEVONSHIRE, 1833– ; statesman; graduated at Trinity College, Cambridge, 1854; was connected with the special mission of Earl Granville to Russia, 1856; appointed Lord of the Admiralty, March, 1863; 1866 became Secretary for War; from 1869–71 was Postmaster-general in Gladstone's Cabinet; 1871–74 Chief Secretary for Ireland; succeeded Gladstone as the leader of the Liberal Party in the House of Commons; became Lord Rector of the Univ. of Edinburgh, January 31, 1879; in April, 1880, he became member of Parliament for NE. Lancashire; Secretary of State for India, 1880–82; Secretary for War, 1882–85; a leader of the Liberal Unionists in 1886. On the death of his father in 1891 he succeeded to his title and estates. He married the Dowager Duchess of Manchester, August 16, 1892.

Hart'mann, Karl Robert Eduard, 1842–1906; German philosopher; b. Berlin; became an officer of artillery, 1861, but resigned on account of an injury, 1862, and gave himself to literary and philosophical studies. His works include "The Philosophy of the Unconscious," "The Ethical Consciousness," "The Philosophy of Religion," and "Æsthetics."

Hartmann, Moritz, 1821–72; Austrian novelist and poet; b. Duschnik, Bohemia; left the empire on account of his political liberalism, 1844; was in the Frankfort Parliament of 1848; lived for a time in the East and then in Paris; became a lecturer on German history and letters in the Academy at Geneva, 1860; lived in Stuttgart and Vienna after 1863. His works include the poem "Chalice and Sword," the rhymed "Chronicles of Father Mauritius," and the novels "The Prisoner of Chillon," and "The Diamonds of the Baroness."

Hartmann von Aue (-fŏn ow' ĕh), d. abt. 1220; German poet; was a feudal dependent of the Herr von Aue in Suabia, took part in one of the crusades; wrote narrative poems, including "Poor Henry," which Longfellow used as the framework for his "Golden Legend," and "Erek," a free version of a French romance of the same name; also songs (*Minnelieder*).

Harts'horn. See AMMONIA.

Hartt, Charles Frederic, 1840–78; American geologist; b. Fredericton, New Brunswick; became Prof. of Geology at Vassar College, 1866, and at Cornell Univ., 1868; made repeated excursions to Brazil, exploring the coast provinces and the Amazon. In 1875, at the invitation of the Imperial Government, he organized the *Commissão Geologica do Brazil,* which was continued until his death. His largest published work, "Geology and Physical Geography of Brazil."

Hartz (härts), or **Harz,** isolated group of mountains in NW. Germany, forming an elevated plateau, intersected with deep valleys and rising in different places into high peaks. These mountains, which cover an area of about 800 sq. m., occupying Brunswick and parts of Hanover and Prussian Saxony, are covered with forests, and are exceedingly rich in minerals—gold, silver, lead, iron, marble, and alabaster. The highest peak is the Brocken, 3,740 ft. high, and is the birthplace of many weird superstitions and fairy tales.

Hartzenbusch (härtz'ĕn-bōsh), **Juan Eugenio,** 1806–80; Spanish dramatist and man of letters; b. Madrid; son of a German cabinetmaker; practiced that trade until 1833; then became a government stenographer; was made assistant librarian of the national library at Madrid, 1844, and chief librarian, 1862; works include the dramas "Doña Mencia," "The Lovers of Teruel," the dramatic poem "Alfonso of Castile," and "Tales and Fables."

Harun-al-Rashid (hä-rōn'-äl-räsh'ĭd). See HAROUN-AL-RASCHID.

Haruspice (hä-rŭs'pĭs). See ARUSPICE.

Har'vard, John, 1607–38; American clergyman and benefactor; b. Southwark, England;

was ordained a Dissenting minister, and, 1637, emigrated to Massachusetts. In 1638 some land was set off for him in Charlestown, where he performed the duties of minister. In that year he was one of a committee to consider matters "tending toward a body of laws." He left his library and half his estate toward the founding of a college (Harvard).

Harvard Univer'sity, oldest and largest educational institution in the U. S.; at Cambridge, Mass.; founded, 1636, by the General Court of Massachusetts Bay, but not established until 1638, when the gifts of John Harvard made it possible to open the institution. At first it was but little more than a school for Indian youths. The term university was first applied to it in the constitution of Massachusetts of 1780. For a generation after the schism which divided the New England Congregational churches in the first quarter of the nineteenth century it was under Unitarian control, but is now undenominational.

Each department of the university has its own dean and faculty, but the College, the Graduate School, and the Lawrence Scientific School have also a faculty in common, called the faculty of arts and sciences. The Graduate School gives the degrees of A.M., Ph.D., and S.D.; the Scientific School (1847), the degree of S.B. In Cambridge, too, though governed by independent faculties, are the Divinity School (1819), undenominational, which requires of candidates for its degree of D.B. that they shall already possess the degree of A.B.; and the Law School (1817), whose course is three years. The other departments of the university are not in Cambridge. In Boston are the Medical School (1783), requiring a four years' course of study; the Dental School (1867) and the School of Veterinary Medicine (1882), each giving its degree after a graded course of three years. The School of Agriculture and Horticulture, known as the Bussey Institution (1861), is in Jamaica Plain, within the limits of Boston. The beautiful Arnold Arboretum occupies 120 acres of the Bussey estate. The library (1839-77), observatory (1846), botanic gardens (1805), university (1852-89) and Peabody museums (1876-89), Memorial Hall (1870-76), the gymnasiums (1879 and 1890), boat houses (1870 and 1890), and athletic grounds are all in Cambridge. To students in one department of the university instruction in all others is open without additional charge. Summer school courses, yielding no degree, and mainly in science, history, language, and physical training, are offered in Cambridge for a small fee, and are attended by large numbers of teachers and other students.

Radcliffe College for Women, formerly popularly called the "Harvard Annex," an institution in Cambridge for young women, is affiliated with the university. In 1908 Andover Theological Seminary was absorbed by Harvard. The total number of students in Harvard, 1908-9, was 4,915.

Har'vest Bug (*Leptus autumnalis*), one of the *Acarus* family, which receives its name from the fact that it attacks the workmen at harvest. It thrives especially about the middle of July, is found on blades of grass and other growths, and thence gains access to the legs, thighs, and abdomen of persons walking in the fields. It has a minute, brilliant red or pink body, and occasions intolerable itching and sometimes even ulceration.

Harvest Moon, the name given in high N. latitudes to the full moon which occurs about the time of the autumnal equinox. The circumstance which has given it its name is that during this period the rising of the moon for several successive days before and after the full takes place nearly at the same hour, thus favoring the work of the farmer during harvest, whereas, taking the year through, the rising is retarded on an average about fifty minutes later each day.

Har'vey, Sir George, 1806-76; Scottish artist; b. St. Ninians, near Stirling; settled in Edinburgh; became President of the Royal Scottish Academy, 1864; works include "Covenanters Preaching," "Covenanters' Communion," and "The Curlers"; knighted 1867; published "Color of the Atmosphere" and "Notes of the Early History of the Royal Scottish Academy."

Harvey, Hayward Augustus, 1824-93; American inventor; b. Jamestown, N. Y.; son of Brig.-Gen. Thomas W. Harvey, inventor of the gimlet-pointed screw; was a draughtsman in the office of the New York Screw Company, 1844-50; superintendent of a wire mill at Somerville, N. J., 1850-52; became connected with the Harvey Steel and Iron Company, of which his father was president, 1852. In 1854 he founded the Wangum Steel Company, of Connecticut, and the Continental Screw Company, of Jersey City, with new patents for making wood screws, 1865; took out, 1888, the first patents for hardening steel on the surface, or carbonizing it, and raising steel of a low grade to a higher one; subsequently perfected his process and made "Harveyized steel" famous.

Harvey, William, 1578-1657; English physician; the discoverer of the circulation of the blood; b. Folkestone, Kent. He became physician to Bartholomew's Hospital, London, 1602; Lumleian lecturer on Anatomy and Surgery, 1615; physician to James I and Charles I; and warden of Merton College, Oxford, probably 1643. His discovery of the circulation of the blood seems to have been suggested by him 1616, announced 1619, and published in the "Exercitatio de Motu Cordis et Sanguinis," 1628. Other "Exercitationes" on the subject appeared 1649.

Has. See HARTZ.

Has'drubal, or As'drubal, d. 204 B.C.; Carthaginian military officer; son of Gisco; served in Spain in the second Punic War; was totally defeated by Scipio at Silpia, 206 B.C.; again before Carthage; and committed suicide by poison.

Hasdrubal, d. 207 B.C.; Carthaginian military officer; son of Hamilcar Barca and brother of Hannibal; was defeated by the Scipios

on the Iberus, 216 B.C.; crossed the Alps, 207, and entered Italy to reënforce his brother, but was intercepted, defeated, and slain at the Metaurus in Umbria.

Hasdrubal, d. 220 B.C.; Carthâginian military officer; son-in-law of Hamilcar Barca; was a leader of the popular party in Carthage after the conclusion of the first Punic War; accompanied Hamilcar to Spain, and, after the latter's death, carried out his kinsman's plans; formed the S. and E. coasts of Spain into Carthaginian provinces, and founded many towns, including Nova Carthago, the modern Cartagena. The treaty in regard to the Iberus was made by the Romans with Hasdrubal, not Carthage, so independent was his sway. He was assassinated by a slave.

Hase (hä'zĕh), **Karl August,** 1800–90; German theological author; b. Steinbach, Saxony; became Prof. of Philosophy at Leipzig, 1829; of Theology at Jena, 1830; was long a prominent Rationalist; works include "Manual of Evangelical Dogma," "Compendium of Universal Church History," "Life of Jesus," "Gnosis."

Hash'ish, variety of *Cannabis sativa* (hemp), cultivated in districts N. of Calcutta for the production of (1) *bhang* (Hindustani), *hashish* (Arabic), the dark-green stalks and green leaves used in smoking, or as a constituent of a sweetmeat (*majun*); (2) *ganja*, the flowering shoots brought into the London drug market under the name of *guaza;* (3) *charas*, or *churrus*, the resin which exudes from the branches and leaves of the plant. Hashish has long been employed in medicine in Asia. Arabs, Persians, Indians, Chinese, and S. Africans esteem it for its intoxicating powers; but there are many people of European race who are scarcely influenced by it; and on those who are intoxicated by its use the effects are extremely varied. On some persons its influences as an anodyne and hypnotic in certain diseases are very happy.

Hass'ler, Ferdinand Rudolph, 1770–1843; American surveyor; b. Aarau, Switzerland; Prof. of Mathematics at West Point, 1807–10; sent as scientific ambassador to Europe; first superintendent of the U. S. Coast Survey which he conducted, 1816–18 and 1832–43; for years chief of the Bureau of Weights and Measures. He was author of text-books on mathematics, "System of the Universe," and of many valuable scientific reports, including "Report to the U. S. Senate on Weights and Measures."

Has'tings, Francis Rawdon (first Marquis of), 1754–1826; British general; son of the Earl of Moira; was sent to America, 1773; took part in the battle of Bunker Hill, 1775; became adjutant general of the British forces in America, 1778; defeated the Americans at Camden, S. C., 1780; subsequently defeated Greene at Hobkirk's Hill. On his return to England he was created Baron Rawdon, 1783; succeeded his father as Earl of Moira, 1793; fought against the French in Flanders, 1794; became master general of ordnance, 1806; Governor General of India, 1813–23; had a prosperous administration; created Viscount Loudon, Earl of Rawdon, and Marquis of Hastings, 1816; Governor of Malta from 1824 till his death.

Hastings, Warren, 1732–1818; British statesman; b. Churchill, Oxford; went to Bengal, 1750; served under Clive, 1757; was resident at the court of Mur Jaffir, 1757–61; became a member of the council at Calcutta, 1761. He returned to England, 1764, but was again in India, 1769; became second in the Madras Council, 1769, and president of the Supreme Council of Bengal, 1772; first Governor General of India, 1774–85; compelled the Madras Govt. to give up the revenues of the Carnatic to the nabob, 1783, in disobedience to the orders of the directors; quarreled frequently with his council; made the conquest of Benares, 1784; confiscated a portion of the lands and treasure of the Begum of Oudh; returned to England, 1785, and was impeached for high crimes and misdemeanors. In his trial, February 13, 1788–April 23, 1795, the ability and eloquence of Burke, Sheridan, and Fox failed to convict him, it having been conclusively proved that India had improved greatly under his rule.

Hastings, parliamentary and municipal borough of England, in Sussex; on the English Channel; 62 m. SSE. of London. Here William the Conqueror landed, and the decisive battle known as the battle of Hastings was fought, 1066, at Senlac, in the vicinity. Hastings is best known as an elegant and much-frequented watering place. Pop. (1908) 67,817.

Has'well, Charles Haynes, 1808–1907; American civil engineer; b. New York; was appointed chief engineer in the U. S. navy, 1836; was engineer in chief, 1844–50. In 1837 he designed and constructed the first practicable steam launch, and was first to protect marine steam boilers and the holds of iron vessels from the galvanic action of salt water and copper by the application of zinc instead of iron lining; designed and superintended the completion of Hoffman Island, in the lower bay of New York, and the crib bulkhead at Hart's Island. He has published "Mechanic's and Engineer's Pocket Book," "Mechanic's Tables," "Mensuration and Practical Geometry," and "Reminiscences of an Octogenarian of the City of New York."

Hat. See HEADDRESS.

Hatasu (hä'tä-sô), variously called HATSHEPSET, CHNEMT-AMUN, MA-KA-RA, or RAMAKA, Egyptian queen of the eighteenth dynasty; daughter of Thothmes I, sister of Thothmes II, and half-sister of Thothmes III. She was associated successively with all three in royal office; as coregent in the later years of the first, as queen of the second, and as guardian and coregent with the last. She left many monuments, some of which were dedicated to her father, and built at Thebes the wonderful temple known as Deir-el-Bahri. She assumed man's attire and caused herself to be addressed as a male. She probably ruled in all about twenty years; Thothmes III was associated

with her in the sixteenth year of her reign. Gradually, however, Thothmes III gained the supreme power and the final fate of the queen is unknown, but it is suspected that she was the victim of violence.

Hatch'el. See HACKLE.

Hatch'ie Riv'er, stream having its source in the NE. of Mississippi; flows N. into Tennessee, and then WNW. to the Mississippi; mouth 25 m. N. of Memphis. Small steamboats can run for half the year as far up as Bolivar, Tenn., 150 m. from its mouth.

Hatch'ment, display of the heraldic bearings of any person; in modern Great Britain, a tablet painted with the escutcheon, etc., and hung on the front wall of a house in which there has died, or which belonged to, the person whose arms are represented on the *hatchment*.

Hat'field, town in Hampshire Co., Mass.; on the Connecticut River; 5 m. N. of Northampton; has considerable manufactures of lumber, etc., and is the seat of an academy. It was during colonial times much exposed to Indian attacks, and spirited fights occurred here May 30 and October 19, 1675. On September 19, 1677, the Indians made a bloody assault on the settlement. Pop. (1905) 1,779.

Ha'thor, Egyptian goddess of love, beauty, and joy; daughter of Ra, and wife of Tum; other titles, "Lady of Heaven," and "Eye of Ra." She was represented in many forms, corresponding to the attributes for which she was worshiped. In general she was pictured as a cow, or as a cow-headed woman with horns and the sun disk. She was also called "Mistress of Punt," and was a patron of the sailor, being invoked for a favorable wind. The "Seven Hathors" were, in a way, regarded as fairy godmothers who presided at the birth of royal children and foretold their fates, more especially the manner of their death.

Hat'ton, John Liptrot, 1809–86; English composer and pianist; b. Liverpool; self-taught in music; settled in London, 1832, and began a professional career as composer, pianist, and conductor. His earliest opera was "The Queen of the Thames," then came "Pascal Bruno" at Vienna. His opera "Rose, or Love's Ransom" was produced, 1864, the cantata "Robin Hood," 1856, and the oratorio or sacred drama "Hezekiah," 1877. He wrote incidental music for many of Shakespeare's plays, two cathedral services, several anthems, and an immense number of songs and part songs both for male and for mixed voices.

Hatzfeldt (hätz'fĕlt), **Paul Melchior Hubert Gustav** (Count von), 1831–1901; German statesman; son of Countess Sophie von Hatzfeldt, the friend of Lasalle; accompanied Bismarck to Paris in the Franco-German War; was minister at Madrid, 1874; ambassador at Constantinople, 1878; foreign secretary, 1882; ambassador to London, 1885–1901.

Hau'berk, defensive garment of chain mail, the most important piece of body armor of the Middle Ages, during the thirteenth and fourteenth centuries. The haubergeon was probably a shorter garment of the same kind, but the true hauberk reached the knees or came below them; it had long sleeves, and often mittens forming part of the sleeves; moreover, a hood or coif which covered the head was also made in one piece with the body, and could be drawn forward or thrown back on the shoulders at pleasure. Such a hauberk weighed about 25 lbs., without its necessary linings of leather or other material, meant to keep the body from the severe bruises of sword strokes taken on the steel links.

Hauch (howkh), **Johan Carsten von,** 1790–1872; Danish writer; b. Frederikshald, Norway; lectured on physics at the Academy of Sorö, 1827–46; was Prof. of Scandinavian Language and Literature at Kiel, 1846–48; Prof. of Æsthetics at Copenhagen after 1851. His works include the dramas "The Two Sisters from Kinnacliff" and "Tycho Brahe's Youth"; the tragedies "Tiberius" and "Mark Stig"; and the novels "The Alchymist" and "The Castle on the Rhine."

Hauff (howf), **Wilhelm,** 1802–27; German romance writer and poet; b. Stuttgart; became editor of the Stuttgart *Morgenblatt*, 1827. His works include the still popular novel "Lichtenstein," "The Beggar of the Pont des Arts," "Tales," and "The Man in the Moon," a satire.

Hauge (how'gĕ), **Hans Nielsen,** 1771–1824; Norwegian reformer; b. in the Smaalenene country; began to preach, 1795; protested against the rationalism and secularization prevalent among the Norwegian clergy, and opposed to them a movement laying especial stress on the spiritual priesthood of all believers. His zeal led to his imprisonment, 1804–14. His followers became known as Haugians, or Readers. In the U. S. Elling Eilsen, who adopted Hauge's position, founded a synod, 1846, which numbered 21,181 communicants in 1906, chiefly in Minnesota, S. Dakota, and Wisconsin, and had a theological seminary at Red Wing, Minn.

Hauks'bee, or Hawks'bee, Francis (the Elder), d. abt. 1712; English scientist; invented one of the first machines for electrification by friction, and a variety of other apparatus; wrote numerous papers on natural philosophy; also a work entitled "Physico-mechanical Experiments on Various Subjects touching Light and Electricity."

Haupt (howpt), **Herman,** 1817–1905; American civil engineer; b. Philadelphia; graduated at West Point, 1835; resigned the next year to engage in engineering; Prof. of Civil Engineering and Mathematics in Pennsylvania College, 1844–47; chief engineer Pennsylvania Railroad, 1847–61; chief of bureau of military railways during the Civil War; chief engineer of the Hoosac Tunnel for several years; subsequently general manager of several railroads; chief works "General Theory of Bridges" and "Military Bridges."

Haupt'mann, Gerhardt, 1862– ; German poet and dramatist; b. Salzbrunn, Silesia. His

works, which are characterized by their pessimism and their interweaving of German national traditions with those of a newer Scandinavian school, include the plays, or rather dream poems, "Hannele Mattern," "The Sunken Bell," "Poor Henry," and "The Apostles," an attempt at fiction.

Hauran (hä-ō-rän'), present Arabic as well as English name of a district in Syria S. of Damascus and E. of the Jordan, mentioned by Ezekiel, and nowhere else in the Old Testament, as the appointed NE. boundary of the Holy Land after the captivity in Babylon. Its dimensions are not indicated.

Hausa (how'sä) **States,** large area in the W. and central Sudan, where the Hausa language predominates, but not constituting any political division; embraces the Fulbe States of Gando and Sokoto with Adamawa, tributary to Sokoto. The region is mostly E. of the Niger River, and N. of its Benue affluent, with the Sahara as its N. and Bornu as its E. boundaries. The field of the Hausa language is greater than that of any other in central Africa. It is, in fact, a Lingua Franca, and is the common vehicle of communication among tribes speaking different languages.

Hauser (how'zĕr), **Kaspar,** 1812–33; German foundling, picked up in the streets of Nuremburg, 1828; had previously lived, according to his own story, underground, and been scantily fed by an unknown jailer, who had taught him to write. His education was begun, but an extraordinary memory and an acute understanding decreased in proportion as the sphere of his knowledge extended. Some believed him to be the hereditary Prince of Baden. Several attempts to assassinate him were made, and he was finally stabbed to death.

Haussmann (ōss-män'), **Georges Eugene** (Baron), 1809–91; French administrator; b. Paris; studied law, and became an advocate; was subprefect of various departments, and prefect under the presidency of Louis Napoleon. He became prefect of the Seine, 1853, and under his administration various beautiful improvements were completed, but at an expenditure that involved the city in a debt of some 8,000,000 fr.; left France for a time after the fall of the empire; was appointed director of the Credit Mobilier, 1871; elected to the Chamber of Deputies, 1877.

Haüy (ä-wē'), **Rene Just,** 1743–1822; French mineralogist; b. St.-Just; became a church singer at Paris, and a teacher in the College of Navarre, 1764. In 1781 he laid before the Academy of Sciences his discovery of the geometrical law of crystallization; took orders in the Church; keeper of the cabinet in the School of Mines, 1794; became a member of the Institute, 1795; Prof. of Mineralogy in the Museum of Natural History in 1802. His works include "Exposition of the Theory of Electricity and of Magnetism," "Treatise on Chrystallography."

Haüy, Valentin, 1746–1822; French educator; b. St.-Just; brother of the preceding; invented the art of printing with raised letters for the blind. The schools for the blind of this philanthropist were everywhere failures, owing to his lack of judgment, yet he is universally recognized as the "apostle of the blind."

Havan'a, capital of the Republic of Cuba; the most important city of the W. Indies, and one of the principal commercial marts of America; on the N. shore of the island of Cuba, on an inlet of the Gulf of Mexico; its harbor is one of the finest in the world; capable of accommodating 1,000 vessels; lined with commodious, mostly covered wharves, and provided with a capacious dry dock. The architecture of the city is mostly that of S. Spain. The most prominent public buildings are the opera house, one of the largest in the world; the cathedral, built 1724; the presidential palace, with apartments for the government officers, and the Morro Punta, and La Cabana fortresses. With respect to its public parks and promenades Havana perhaps surpasses all other cities in the world. The city has a university, an excellent botanical garden, many scientific, educational, and benevolent institutions, and is the seat of a Roman Catholic bishop.

Its manufactures are not important, with the exception of those of tobacco. Havana is the chief commercial port of the island, exporting sugar, tobacco, fruits, etc., in large quantities. It communicates by lines of steamers with Spain, France, England, and the U. S.; by telegraph with Key West, Kingston, and Aspinwall; and by rail with Cardenas, Cienfuegos, Matanzas, and all important W. parts of Cuba. Havana was founded 1519; previous to that time there was a place of the same name on the S. side of the island. From 1761 till after the American occupation it was frequently ravaged by yellow fever. The U. S. battle ship *Maine* was blown up in Havana harbor, while on a friendly visit to the island, February 15, 1898. The city was evacuated by the Spanish, January 1, 1899; and was the seat of the American military government till the official withdrawal, May 20, 1902, and of the American administrator, 1906–7. Pop. (1907) 279,159.

Hav'elock, Sir Henry, 1795–1857; British soldier; b. at Bishop-Wearmouth, England; entered the army, 1815; went to India, 1823. He served with distinction in Burma, 1824–26, and during the Afghan War; became adjutant general in India, 1851; served in Persia, 1856–57; gained over Nana Sahib the brilliant victories of Cawnpur, Bithur, etc.; relieved and reënforced Lucknow, September 25, 1857; was made K. C. B. and baronet.

Haverhill (hā'vĕr-ĭl), city in Essex Co., Mass.; at the head of navigation on the Merrimac River; 32 m. N. of Boston; contains the former villages of Ayers and Rocks and former town of Bradford; is noted for its manufactures, which in 1905 embraced 320 factory-system plants, operated on a capital of $10,305,950, and yielding products valued at $24,446,954; principal articles, boots and shoes, boot and shoe stock, lumber products, cotton and woolen goods, hats, and brick. The river is here spanned by several bridges, connecting with thrifty towns and villages. Among the

local attractions are a Soldiers' and Sailors' Monument in marble, and a monument in bronze to the memory of Hannah Dustin. Pop. (1905) 37,830.

Haverhill, originally the Indian village of Pentucket, was settled 1640, made a town 1645, a city 1869; was the birthplace of John G. Whittier.

Havre (ä'vr), fortified seaport of France; department of Seine-Inférieure; at the mouth of the Seine; 143 m. NW. of Paris; has fine broad streets, magnificent city hall, and a sixteenth- century church (Notre Dame); is defended by modern fortifications erected on the surrounding heights. Its harbor, consisting of ten spacious basins, and well provided with wet and dry docks, is one of the best in the world, and, next to Marseilles, Havre is the most important commercial place of the country, one fifth of the foreign commerce of France being credited to this city. It is prominent as a place of embarkation for emigrants, and has steamship communication with New York, Havana, Rio de Janeiro, Calcutta, and all the chief commercial places in Europe, exporting wine, brandy, oil, and different kinds of French manufactures, cloth, leather, jewelry, etc. Pop. (1906) 132,430.

Hawaii (hä-wī'ē), **Hawai'ian Is'lands,** or **Sand'wich Islands,** archipelago in the Pacific Ocean, constituting a territory of the U. S.; 3,500 m. W. of Mexico, and 2,700 m. SW. of San Francisco; area, 6,449 sq. m.; pop. (1908) between 175,000 and 180,000; capital, Honolulu on Oahu. The islands, twelve in number, are Hawaii, Maui, Kahoolawe, Lanai, Molokai, Oahu, Kauai, Niihau—habitable; and Molokim, Lehua, Kaula, and Nihoa—barren rocks. The islands are to a great extent mountainous and volcanic. The altitude of Mauna Kea, the highest point on the island of Hawaii is 13,805 ft. There are few good harbors. The climate varies, according to locality, from cool, frosty weather to a high average of heat the year through. The NE. trade winds blow the greater part of the year and prevent the heat from becoming oppressive. Showers are frequent in the summer, and in the winter severe S. and W. rain storms, lasting for days and even weeks, are liable to occur. At Honolulu, the average height of the barometer is 30.054 in.

Among the minerals are sulphur, pyrites, salt, chrysolite, garnet, gypsum, copperas, niter, and glauber salt. The soil is fertile and well adapted to planting and grazing. The mountain sides abound in forests, in which there is a plenty of ship timber and ornamental woods. Numerous streams, many of them large, flow down the mountains to the sea. Sugar and rice are the principal products; sugar, wool, tallow, hides, rice, pulu, coffee, and bananas are exported in considerable quantites. In the year 1907-8 the total exports to the U. S. amounted to $41,640,815; imports from the U. S., $15,303,325; exports to foreign countries, $597,640; imports, $4,862,399. Imports are chiefly provisions, hardware, machinery, agricultural implements, and wearing apparel. The machinery used in the sugar factories is largely made in Honolulu. There are about 128 m. of railway in the islands. Elementary education is free. The language in general use in the schools is English. The higher institutions include a college under Protestant trustees, a normal and training school, and a reformatory industrial school for boys. The Roman Catholics slightly outnumber the Protestants; there are some 45,000 Buddhists, and a few thousand Mormons. Nearly all the natives are Christians.

The Hawaiian Islands were discovered by Gaetano, a Spanish navigator, 1542. Capt. Cook, the English navigator, visited them, 1778, and named them the Sandwich Islands. The natives, believed to have come originally from the Malay Archipelago, numbered at the time of Cook's visit abt. 300,000. The Hawaiians at this time supported an elaborate feudal system, closely analogous to that of Europe in the Middle Ages. From 1778 to 1820 the decimation by war and disease was immense. In 1819-20 the people voluntarily destroyed their idols and temples. In 1820 Protestant missionaries from the U. S. arrived, and began the work of Christianizing and teaching the people; they also reduced the language to writing. In 1825 the Ten Commandments were adopted as laws by the government. The first Roman Catholic missionaries arrived, 1827. Prior to 1838 the government was a despotism. In 1840 the king, Kamehameha III, granted a constitution, providing for an assembly of nobles and a representative council.

In 1843 the independence of the kingdom was formally declared by the French and English governments. In 1893 the queen, Liliuokalani, was deposed because she had evaded some of the provisions of a new constitution, and a provisional government, representing for the most part the American element, was formed. This took steps to secure annexation to the U. S., and a treaty was sent to the U. S. Senate for ratification. This was withdrawn by Pres. Cleveland. On July 4, 1896, the Republic of Hawaii was proclaimed under the presidency of Sanford B. Dole. In 1898 the islands were annexed by the U. S., and have since been under a governor appointed by the President, while for military purposes they are attached to the Department of California. On June 14, 1900, they were constituted the Territory of Hawaii. The organic act was amended in 1905. There is a legislature of two houses, a senate of fifteen members elected for four years, and a house of representatives of thirty members elected for two years. Sessions are held biennially. The governor and secretary are appointed for four years by the President of the U. S.; other territorial officials are appointed by the governor with consent of the Hawaiian Senate. The territory is represented in Congress by a delegate elected biennially.

Hawaii, island of the Hawaiian group; of triangular form about 90 m. long by 70 broad; area, 4,015 sq. m.; was called Owhyhee by Capt. Cook; contains two thirds of the area of the islands, but only one third of the popula-

tion. Here are valuable sugar estates and cattle and sheep ranches. On Hawaii are the great volcanoes of Mauna Kea in the NE. Heralalai in the NW., and Mauna Loa in the S. Kilauea is an enormous crater, 1,000 ft. deep, lying to the E. of Mauna Loa. Pop. (1900) 46,843.

Haweis (hois), **Hugh Reginald,** 1838–1901; English clergyman and author; b. Egham, Surrey; was curate of St. James's, Marylebone after 1866; editor of *Cassell's Magazine* after 1868; was a prominent advocate of cremation. He was Lowell lecturer at Boston and university preacher at Cornell and Harvard, 1885; chief works, "Music and Morals," which went through numerous editions; "Shakespeare and the Stage," "American Humorists," "Life of Queen Victoria," "The Broad Church," "Old Violins," "My 100,000 Mile of Travel," etc.

Haw'finch, common grosbeak of Europe and Asia; is a shy forest bird, but quite destructive

HAWFINCH.

of small fruits, seeds, and the like. It is variegated with black, white, brown, and gray of various tints, and is 7 in. long.

Hawk, popular name for the many birds of prey of the family *Falconidæ*, mostly smaller

SHARP-SHINNED HAWK.

than those known as eagles, and having, as a rule, shorter wings than the true or noble falcons.

Hawke, Edward (Baron), 1715–81; English admiral; b. London; entered the navy at an early age; 1734 had risen to the command of a vessel; after the naval battle of Toulon, 1774, was tried and dismissed from the service for disobedience of orders in breaking through the line and capturing a Spanish ship of superior force; but was immediately restored by George II; 1747 was made rear admiral of the white, and gained a victory over a French squadron off Belle-Isle on the coast of France; 1756 superseded Admiral Byng in the Mediterranean; 1759 gained a famous victory over the French fleet under Conflans in Quiberon Bay, thus preventing a projected invasion of England; 1765 was appointed vice admiral of England and First Lord of the Admiralty, and 1776 was created Baron Hawke.

Hawkesbury (hâks'bẽr-ĭ), river of New South Wales; flows first NE. nearly parallel with the coast, and then SE., entering the Pacific at Broken Bay, 20 m. N. of Sydney. The Sydney-Newcastle railway crosses it by a seven-span bridge 2,900 ft. long. The river is 330 m. long, but the upper portion is called the Wollondilly.

Hawkes'worth, John, 1715 or 1719–73; English author; b. London; became compiler of parliamentary debates for The *Gentleman's Magazine*; for the same periodical was critic, 1765–72; was the author of 70 of the 140 papers published in *The Adventurer*, 1752–54, in consequence of which he received the doctorate from the Archbishop of Canterbury. He was author of "Zimri," oratorio; "Edgar and Emeline," drama; "Almoran and Hamet," a tale; prepared for the government an account of the first voyage of Cook and the voyages of Byron, Wallis, and Carteret, 1773, which called forth severe criticisms.

Hawk'ing. See FALCONRY.

Hawkins, Sir John, abt. 1532–95; English navigator; b. Plymouth; in youth made several voyages to Spain, Portugal, and the Canary Islands; 1562–68 was engaged in the slave trade. In 1573 Queen Elizabeth appointed him Treasurer of the Navy; served, 1588, as rear admiral against the Spanish Armada, and was knighted; 1590 was sent with Sir Martin Frobisher to intercept the Plate fleet, and to harass the trade of Spain; 1595 commanded, with Drake, an expedition against the Spanish possessions in the W. Indies, and died at sea.

Hawkins, Sir John, 1719–89; English author; b. London; was an attorney, acquired a large fortune, and afterwards devoted himself to music. He composed the words for several sets of madrigals, and published a "General History of the Science and Practice of Music" (5 vols.), an edition of Walton's "Complete Angler," and a memoir of Dr. Johnson, whose works he edited.

Hawk Moth, proper name of the second or crepuscular division of the order *lepidoptera*, corresponding to the old genus *sphinx*. They are among the largest of *lepidoptera*. They

have short bodies and narrow, strong wings, and their flight is swift and powerful. They often stand poised in the air like humming birds, and in general obtain their food from

HAWK MOTH.

flowers after the manner of humming birds, whence they are popularly called humming-bird moths, or hawk moths. The larvæ are mostly destructive plant feeders, and among them is the well-known tomato worm.

Hawks'bee. See HAUKSBEE.

Hawk'bill Tur'tle, popular name of the species of sea turtle which furnishes the "tortoise shell" of commerce; given on account of its horny beak, which suggests that of a bird

HAWKBILL TURTLE.

of prey. This turtle is an inhabitant of the tropical seas, but usually the individuals of the Indian and Pacific oceans are separated as a distinct species.

Hawthorne, Nathaniel, 1804–64; American author; b. Salem, Mass.; employed in the Boston Custom-house, 1838–41; joined in the Brook Farm experiment, 1842. In 1843 he married and went to Concord, Mass., where he lived in the old parsonage, afterwards immortalized by him in "Mosses from an Old Manse." While there he was the associate of Emerson, Thoreau, Ellery Channing, and other congenial friends. He was surveyor of the port of Salem, 1846–50, and while there wrote "The Scarlet Letter," his most successful romance. In 1853–57 he was U. S. consul at Liverpool, and afterwards spent some years in Italy. Besides the works mentioned he wrote "the House of Seven Gables," "The Blithedale Romance," "Life of Franklin Pierce," "True Stories from History, etc.," "The Wonderbook," "The Snow Image, etc.," "Tanglewood Tales," "The Marble Faun," and "Our Old Home." After his death appeared a series of "Notebooks," "Septimius Felton," parts of the unfinished "Dolliver Romance," and "Doctor Grimshawe's Secret."

Haxo (äk-sō'), **François Benoît** (Baron), 1774–1838; French military engineer; b. St.-Dizier, Lothringia; distinguished himself at the siege of Lerida, Mequenenza, and Tarragona, under Suchet; directed the construction of fortifications at Belfort, Sedan, Grenoble, and l'Écluse; also the operations at the siege of Antwerp, 1830. He is best known out of France by what is called the "Haxo casemate," formed in the parapet, and, though arched over, covered with earth, and open behind to the terreplein.

Hay, John, 1835–1905; American statesman; b. Salem, Ind.; admitted to the bar, 1861; private secretary to Pres. Lincoln; served for a short time in the Civil War with the rank of colonel and assistant adjutant general; was secretary of legation at Paris, Madrid, and Vienna; *chargé d'affaires* at Vienna; assistant Secretary of State, 1879–81, and Secretary from 1898 till his death; ambassador to England, 1897–98; author of "Castilian Days," "Pike County Ballads," "Translation of Castelar's Democracy in Europe," and, with John G. Nicolay, "Life of Abraham Lincoln."

Hay, forage plants cut for fodder and cured for storage. The plants commonly used for making hay are many kinds of grasses, several leguminous plants, particularly the clovers, and a few plants of other natural families. The production of hay in the U. S., chiefly from grasses and clovers, in the calendar year 1908 amounted to 68,000,000 tons, valued at $621,000,000, raised on 46,486,000 acres. The chief hay-producing states in their order were (1908): Iowa, 6,460,000; New York, 5,717,000; Illinois, 4,743,000; Pennsylvania, 4,677,000; Ohio 4,590,000; Wisconsin, 3,988,000; Michigan, 3,954,000, and Indiana, 3,750,000—all others being below 3,000,000 tons.

Hay Fe'ver, disease recurring in some individuals at certain seasons every year, as in June (rose cold), in the haymaking season (hay fever), or in the autumn (autumnal catarrh). It is a catarrhal affection of the nasal (and sometimes of the bronchial) passages, often with some fever and more or less asthmatic spasm. Sometimes incessant sneezing and coryza are the only prominent symptoms. It is not observed in very hot or very cold countries, on the sea, or at considerable heights in some mountain regions. Probably it is caused by pollen from some plants, this producing violent irritation of the mucous membrane of the nose. Disposition of hay fever is hereditary. The educated and highly nervous are most susceptible to it, and to improve the stability of the nervous system is an important

object of the treatment. Removal from districts where the disease prevails is the only means of cure, before the appearance of frost, but the usual palliatives may be employed, and cocaine applied to the nose alone affords great relief to some patients. An antitoxic treatment has shown excellent results.

Hayden (hā'dn), **Ferdinand Vandeveer,** 1829–87; American geologist; b. Westfield, Mass.; explored the "Bad Lands" of Dakota for Prof. James Hall, bringing back a valuable collection of fossil vertebrates; and then the upper Missouri at his own expense, with similar results. He was for several years geologist on the staff of Lieut. G. K. Warren, during his topographical reconnaissance of the Northwest. After serving in the army as medical officer, he became, 1865, Prof. of Geology and Mineralogy in the Univ. of Pennsylvania. The U. S. geological survey of the territories, under his charge was begun 1867, and the official organization thus initiated was continued and enlarged year after year, becoming finally the U. S. Geological and Geographical Survey of the Territories, and being succeeded, 1879, by the present U. S. Geological Survey. Besides the annual reports of these explorations, he wrote numerous scientific papers, and descriptive sketches of "The Yellowstone National Park."

Haydn (hī'd'n), **Francis Joseph,** 1732–1809; German composer; b. Rohrau, near Vienna. At eight years of age his fine voice and his intelligence attracted the attention of the Dean of Hainburg, who took him to Vienna and, through the influence of Reuter, the chapel master, procured him a place as chorister for the Cathedral of St. Stephen. At thirteen he made his first effort at composing by writing a mass, which was so crude that Reuter laughed him to shame. Not disheartened, Haydn set to work teaching himself the art of composition from the dry and obscure works of the period.

When by the natural change his fine soprano voice was lost, Reuter turned him into the street penniless. A poor barber named Keller gave him a bed in his garret. There, with a worm-eaten harpsichord, a few books, and some scores, he worked in tranquillity. After a while his lessons and playing on the violin and the organ gave him a support. In these early years he was so attracted by the sonatas of Karl Bach as to study closely his style, and he mastered it so well that Bach recognized the complete success of his effort. He was introduced to Porpora, one of the greatest masters of that day, who made him his companion, and gave him invaluable knowledge of the art of Italian singing and of correct, elegant composition. His productions improved much after this, and brought him some personal attention. The precarious period of his life ended 1760, when he became chapel master to Prince Esterhazy and a member of his household. The death of the prince broke the tie which had made Haydn unwilling to travel, and, 1790, he visited London, where his enthusiastic reception was a proof of his renown surprising to him. In 1795, after a second voyage to London and some of the Continental cities, he settled near Vienna, where he remained till his death, modestly receiving the greatest honors from all parts of Europe. Haydn is the father of symphony and of the stringed quartet. He did more to develop instrumental music than any of his predecessors. His works number about 800; of this extraordinary number, his most esteemed compositions are the twelve grand symphonies written for production in London, the fifty last quartets for stringed instruments, and the oratorios "The Seasons" and "The Creation."

Haydon (hā'dōn), **Benjamin Robert,** 1786–1846; English historical painter; b. Plymouth; exhibited his first picture "A Riposo of the Holy Family," 1807. His "Death of Dentatus," 1809, gained a prize of 100 guineas from the British Institution, and his "Judgment of Solomon," 1814, was awarded an equal prize by the same institution. His other works include "Christ Entering into Jerusalem," "Nero Watching the Burning of Rome," "The Raising of Lazarus," and "Christ's Agony in the Garden." He published "Thoughts on the Relative Value of Fresco and Oil Painting" and his "Lectures on Painting and Design."

Hayduk (hī'dōk). See HAIDUK.

Hayes, Isaac Israel, 1832–81; American explorer; b. Chester Co., Pa.; was surgeon to the second Grinnell expedition under Kane, 1853–55; commanded an expedition, 1860–61, in the schooner *United States*, and with a small party in a boat and dog sledges reached (via Smith's Sound) land in lat. 81° 37′ N. He was a medical officer in the U. S. service in the Civil War; went in the steamer *Panther* to Greenland, 1869; wrote "Arctic Boat Journey," "The Open Polar Sea," "The Land of Desolation," and "Cast Away in the Cold."

Hayes, Rutherford Birchard, 1822–93; nineteenth President of the U. S.; b. Delaware, Ohio; was admitted to the Ohio bar, 1845; after practicing at Marietta and Fremont, removed to Cincinnati, 1849. On the outbreak of the Civil War he enlisted and was commissioned major of the Twenty-third Ohio Volunteers; was soon promoted to lieutenant colonel; resisted Lee at South Mountain; cut off the retreat of Morgan and his guerrillas and forced him to surrender. In the famous raid on the Virginia and Tennessee Railroad, 1864, he led the principal assault on the enemy's fortifications; bore an honorable part at Lynchburg, Winchester, Berryville, Fisher's Hill, and Cedar Creek; was promoted to brigadier general and subsequently breveted major general of volunteers. He was a member of Congress, 1865–67; and Governor of Ohio, 1868–76.

As a presidential candidate on the Republican ticket, 1876, he received 4,033,950 popular votes, while Samuel J. Tilden, the Democratic candidate, received 4,284,885. A contest arose, caused by the fact that both parties claimed the electoral votes of Florida, S. Carolina, and Louisiana, and one of those of Oregon, and a special commission was appointed, which decided by a vote of eight to seven, that the

Republican candidates were entitled to them. During his incumbency the affairs of the government were conducted in a manner that will command the favorable judgment of history.

Hayne (hān), **Paul Hamilton,** 1830–86; American poet; b. Charleston, S. C.; was editor of *Russell's Magazine* and the Charleston *Literary Gazette*; served for a time in the Confederate army and wrote a number of popular war songs; publications include "Poems," "Sonnets and Other Poems," "Legends and Lyrics," and "Life of Robert Y. Hayne."

Hayne, Robert Young, 1791–1839; American statesman; b. Colleton district, S. C.; admitted to the bar, 1812; served in the War of 1812; member of the State Legislature, 1814–18, serving one year as Speaker of the House; U. S. Senator, 1823–32; governor, 1832–34; Mayor of Charleston, 1835–36. While in the U. S. Senate he displayed abilities of the first order, and was among the leading opponents of a protective tariff. In 1824 he declared the doctrine that such a tariff is unconstitutional. In January, 1830, occurred the famous debate between Hayne and Daniel Webster on Foote's Resolution, in the course of which Hayne urged the constitutional right of secession. He was, 1832, chairman of a committee in the S. Carolina State Convention which reported the celebrated "ordinance of nullification." To Pres. Jackson's denunciation of the nullification acts, Hayne, when governor, made a defiant reply, and prepared for resistance of the Federal authority; but Clay's compromise measure averted the threatened danger, and another state convention repealed the nullification ordinance.

Hay-Pauncefote (-pâns'fōt) **Trea'ty,** treaty negotiated in 1901 by John Hay, U. S. Secretary of State, and Lord Pauncefote, British ambassador to the U. S. It superseded the Clayton-Bulwer treaty of 1850, and recognized the right of the U. S. to construct, hold, and operate a canal across the isthmus connecting N. and S. America.

Hay'ti. See HAITI.

Haze, impalpable solid matters in the atmosphere which deaden the blueness of the sky and cut off the sharpness of definition of distant objects. This kind of haze is sometimes called "dry," to distinguish it from the thin cloud, which is invisible in itself, but serves to deaden the color of the sky. Haze is most common in the interior of continents, especially in dry seasons, when it is due to a fine dust. Large conflagrations, like forest fires, give rise to a dense bluish haze which may drift many hundred miles from the burning districts and last many days.

Ha'zel, popular name of a genus *Corylus* of trees and shrubs of the family *Cupuliferæ*. Of these, the *C. avellana* and *C. colurna* of Europe and Asia produce the filbert, as well as some of the varieties of nut called cobnut and hazelnut, which are used not only as food, but for their oil. The hazel bush is extensively planted for copses in Europe, and yields material for hoops, hurdles, gunpowder, etc. The

HAZEL LEAVES AND FRUIT.

wild hazel and beaked hazel yield nuts smaller and not so good as those of the European.

Ha'zleton, city in Luzerne Co., Pa.; 80 m. NNW. of Philadelphia; is the center of an anthracite coal region, with forty working mines in the vicinity; the seat of a state hospital and Hazleton Seminary; is largely engaged in the mining and shipping of coal; and has railroad shops, iron works, and manufactures of beer, silk, brooms, flax, macaroni, and burial caskets. Pop. (1906) 15,771.

Haz'litt, William, 1778–1830; English critic; b. Maidstone. In 1793 became a student in the Unitarian College at Hackney, but on leaving it devoted his time to portrait painting. His first literary production was an essay "On the Principles of Human Action" (1805). He delivered lectures on various subjects and contributed to the English periodicals. He was one of the highest critical authorities on art and drama. His works include "Characters of Shakespeare," "View of the English Stage," "Lectures on English Poets," "Lectures on English Comic Writers," "Lectures on the Literature of the Elizabethan Age," and "Life of Napoleon Bonaparte."

Hazlitt, William Carew, 1834– ; English author; b. London; educated for civil engineering, but abandoned it for literature and archæology. Works include "History of the Venetian Republic," "Warton's History of English Poetry," with large additions; "Bibliographical Collections and Notes," eight volumes, 1876–1904; "The Livery Companies of London," "Coins of Europe," and "Our National Faiths and Customs."

Head, Barclay Vincent, 1844– ; English numismatist; b. Ipswich; keeper of coins at the British Museum after 1893; author of "History of the Coinage of Syracuse," "Coinage of Lydia and Persia," "History of the Coinage of Bœotia," and "Historia Nummo-

rum," an exhaustive historical survey of the science of Greek numismatics and the standard work on the subject.

Head, Sir Francis Bond, 1793–1875; English military engineer; b. near Rochester; served with the Royal Engineers at Waterloo; at Fleurus under the Prussian general Ziethen; retired from the army and took charge of a gold and silver mining company in S. America. In 1835 he was appointed Lieutenant Governor of Upper Canada, where he suppressed the insurrection of 1837, for which service he was created a baronet. His published works include "Life of Bruce," "The Defenseless State of Great Britain," "The Horse and his Rider," "The Royal Engineer."

Head'ache, or Cephalalgia (sĕf-ā-lăl'jĭ-ā), a symptom of many diseases, but generally not a disease of itself. The various neuralgic pains about the face, eyes, or ears are not headaches in the strict sense. Brain diseases are frequently attended by headache, particularly when the membranous envelopes are involved. Violent headaches are symptoms in meningitis and brain injuries. Tumors, abscesses, etc., sometimes cause headaches limited to the area of disease, although the localization of the pain to a particular part of the head does not necessarily indicate such growths, though it may be a valuable aid to the physician in determining the cause of the headache. In the onset of various fevers, such as typhoid, and during their course, headache is a frequent symptom. So, too, in more protracted illnesses, generally accompanied by poisonous matters in the blood, such as Bright's disease or malaria. Some persons otherwise well are subject to headaches, severe or trivial, the predisposition being often hereditary. Especially is this true of the form called migraine. Periodical headaches may be due to general nervous disorder or weakness, called neurasthenia, to poor blood, or to organic diseases. Headache is a common effect of disordered digestion. Indiscretion in diet or drinking is apt to be followed by head pains, sometimes confined to the forehead. Much attention has been given to disorders of vision as a cause of headache, cure being effected by the use of suitable eyeglasses.

In many headaches the cause soon becomes evident. The treatment is diverse. In one case it is directed to a normal condition of stomach or bowels; in another to proper action of the kidneys or other excretory channels, and in others to the quieting of nervous excitation, or recuperation from nervous fag. Recurrent and unusually severe headaches must always be regarded as serious. The temporary relief from headache obtained by taking the popular headache medicines is dearly bought, for their action is largely due to their depressing effect on nerves and heart. Many deaths have resulted from their use.

Head'dress, the protection or ornamentation of the human head by the adjustment of the hair, the use of a covering of any sort worn upon the head itself, and the addition of jewels, flowers, chains, or the like; or any of these. The variety of head coverings, although perhaps roughly divisible into hoods, caps, and hats, is indefinitely great, and the different styles of decoration are perhaps as numerous. The Egyptians in antiquity wore thick and elaborate headdresses, as the sunny climate and low latitude of the country would make necessary, but not hats with brims. In default of these they used hoods fitting somewhat closely to the head: perukes or wigs, probably of horse hair or tow, and large high caps, the material of which is often doubtful. The largest and highest are cupola shaped, and are associated with the royal authority. But elaborate dressings of the natural hair were also common among the ladies of the court. Hairdressing among the Greeks as well was often very elaborate, and in early times men as well as women wore their hair long and delicately braided.

The usual badge of royalty among Asiatic nations was the simple fillet tied around the head, the *diadema*; and a similar badge was employed in Greece. Among the Greeks caps of cloth, leather, and felt, close fitting and conical, were worn, both alone and under the helmet, by seamen, mechanics, and soldiers. A hat with a brim, probably always of felt, and called *pétasos*, given to hunters. It was, however, the general custom in the towns, and especially with the wealthier classes, to go bareheaded. Among the Romans nearly the same customs prevailed. The peculiar Roman dress, the toga, was worn with the head bare. But the priests wore a skullcap, and this, with a pointed addition like a spear head, was their peculiar badge; a soft conical cap was worn by artisans, and the putting of this *pileus* upon a slave's head was one ceremony of his manumission. In general, a Roman in the city went bareheaded, but on all necessary occasions he wore hat or cap, as might be more convenient. It was not the custom among men of the Roman world at any time to dress the hair elaborately. On the other hand the *coiffures* of the ladies of imperial times are of amazing elaboration and variety.,

The Romans gave the fillet to their priests alone; the *corona*, or headdress of honor, was given to the successful soldier or the respected citizen as a special reward. Throughout the Middle Ages the hood was the commonest garment of the mechanics, field laborers, and toiling men generally; sometimes small and light, a mere cap, sometimes ample and of heavy material. One reason for the great use of the hood was evidently the facility with which it was made in the cottage, whereas a hat would require a more skilled kind of labor. From the twelfth to the fifteenth century veils in various forms were used. Then in the fifteenth century came a contrast in the tall or spreading headpieces, but still combined with veils. Taste for dainty hairdressing prevailed throughout the sixteenth century, and the headdress was simple. The long hair worn in the early part of the seventeenth century is well known to us from the familiar portraits of Charles I of England. The hats had broad and drooping brims. With the English Restoration and the beginning of the independent reign of Louis XIV, at Mazarin's death begins the reign of wigs which lasted for a century.

In the first years of Louis XVI, when the taste in furniture and decoration generally had become much more severe, the ladies undertook to start a wholly opposite taste in headgear. The mass of frizzled and powdered hair wound about with ribbons, stuck with plumes and flowers, and with jewels on occasion, reached a height of a foot or more above the head, and was even higher when the semblance of a cap of gauze was combined with it, or a little hat or a cluster of feathers was set upon it.

Head'ley, Joel Tyler, 1813–97; American historian; b. Walton, N. Y.; held a pastorate in the Presbyterian church at Stockbridge, Mass.; became assistant editor of the New York *Tribune*, 1846, and Secretary of State for New York, 1856–57; published "Napoleon and his Marshals," "Washington and his Generals," "History of the Second War between England and the United States," "The Great Rebellion," etc.

Headley, Phineas Camp, 1819–1903; American author; b. Walton, N. Y.; admitted to the bar, 1847, and later held pastorates in Presbyterian and Congregational churches. His publications include "Historical and Descriptive Sketches of the Women of the Bible," "Life of the Empress Josephine," "Hero Boy, or Life of General Grant," "Life of Ericsson," biographies of Sheridan and Farragut, "Life of Maj.-Gen. W. T. Sherman," "Life of Gen. U. S. Grant," "Court and Camp of David," and "Public Men of To-day."

Health, that condition of living bodies in which the blood and tissues are in the state of integrity and functional activity inherent in their normal constitution. All of the structures are incessantly undergoing change, owing to the waste and renewal of their ultimate elements, the cells. There is in the constitution of these elements a tendency to development and a tendency to decay. Upon their development depend the growth and maintenance of the organism, while in their decay we have their destruction after they have performed their proper functions. In the young the tendency to development is greatest, and the result is growth; in the middle aged these forces are balanced, and the structures are maintained in bulk and symmetry; in the later periods the tendency to decay predominates and the organism wastes, and at length falls into inevitable decay and death. So infinitely numerous are the elementary parts, and so various and powerful the causes which impair their integrity and prevent their functions, that there must be abnormal conditions constantly occurring which do not sufficiently impair structure and function to enable us to appreciate the deviation from the natural standard. It is only when changes in structure and function are so great as to be detected by the means which we employ for investigation that we can decide that a condition of health does not exist.

Health Laws, laws passed for the regulation of the acts of private citizens in order to protect the health of the community. The chief matters so regulated are adulteration of food, liquor, and drugs; the location and use of cemeteries, and the interment of the dead; drains and sewers; the selling of drugs and liquors; hospitals; the cleaning of the streets; the supply of water; sanitary regulation of hotels, dwellings, and lodging houses; regulation of workshops, factories, and mines, both as to sanitation and as to employment of children therein; prevention and abatement of nuisances and of trades offensive to the public comfort; regulation of the practice of medicine; treatment of infectious diseases; and the use of public parks and baths. Such laws are most numerous and of chiefest importance in thickly settled communities, where the acts of the individual members of the community necessarily closely affect the condition and welfare of the fellow inhabitants.

The power of a government or body politic to regulate the acts affecting the public health comes under the head of police power, which is an inherent power in every civilized community. The most complete statute providing for the preservation of the public health of a community is the Public Health Act of Great Britain passed in 1875 (38–39 Vict., cap. 55). Such statutes are generally in force in the various states of the U. S. The most complete act in the U. S. is that of the state and local government in the state and city of New York, where a state health board was created in 1880, and continued under the law of 1893, known as the Public Health Law. Health laws usually provide for general sanitary authorities known as boards of health, who are vested with a discretionary power, more or less restricted, for the making of rules and regulations to protect the health of the community. See PURE FOOD LAWS.

Healy (hē'lī), George Peter Alexander, 1808–94; American historical and portrait painter; b. Boston; "Webster's Reply to Hayne" is in Faneuil Hall, Boston; portraits of James Buchanan and Abraham Lincoln are in the Corcoran Gallery, Washington.

Healy, Timothy Michael, 1855– ; Irish politician; b. Bantry; was active in the Land League movement; spoke in the principal cities of the U. S. in behalf of the movement, 1881–82; admitted to the Irish bar, 1884; opposed the leadership of Parnell, 1891, and of Dillon, 1896; member of Parliament after 1883 from Wexford, Monaghan, Londonderry, and Longford; author of "A Word for Ireland" and text-books on the Land Acts.

Heap, David Porter, 1843– ; American engineer; b. San Stefano, Turkey; graduated at West Point, 1864; served in the engineer corps in the Civil War, with the Army of the Potomac. After the war engaged in the construction of fortifications and improvement of harbors; explored the Yellowstone Park region, 1871; had charge of the engineering section of the War Department exhibit at the Philadelphia Centennial; represented the U. S. at the Paris Congress of Electricians, 1881; brigadier general and retired, 1905. He has published "History of the Application of the Electric Light to Lighting the Coasts of France," "Electrical Appliances of the Present Day," and "Ancient and Modern Lights."

Heard Is'land, island in the Antarctic Ocean, lying SE. of Kerguelen's Land; about 24 nautical m. long and 9 broad; highest point (Kaiser Wilhelm Peak) is about 6,000 ft. high; was discovered by Capt. Heard, 1853. Vessels from the U. S. and other countries have here collected large amounts of the oil of sea elephants and the smaller seals.

Hear'ing. See EAR.

Hearn, Lafcadio (Japanese name, YAKUMO KOIZUMI), 1850–1904; Anglo-Japanese author; b. Leucadia, Ionian Islands, of Irish and Greek parentage; settled in the U. S., 1869; became a printer and journalist in New Orleans; went to Japan, 1890; became a subject of that empire; Lecturer on English Literature in the Imperial Univ., Tokyo, 1896–1903; published "Glimpses of Unfamiliar Japan," "Gleanings in Buddha Fields," "Kotto, or Japanese Curios," "Japan; an Attempt at Interpretation," "Stray Leaves from Strange Literature," and other works.

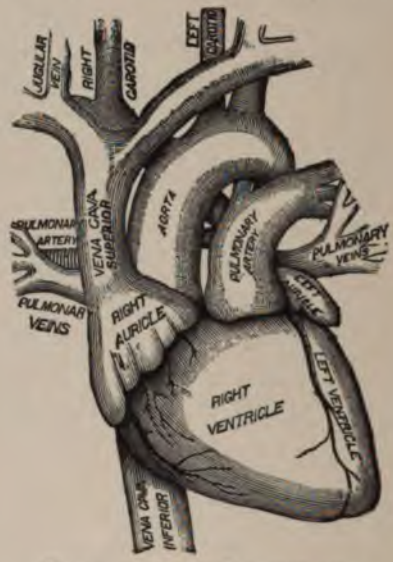
Hear'say Ev'idence, literally, evidence consisting of what one has been told by others. The term is used, however, in a wider sense to include any evidence not based on facts with which the witness is personally cognizant, but on what he has learned from the act or narration of another. With few exceptions, hearsay evidence is inadmissible. See EVIDENCE.

Heart, hollow muscular organ, the center of the circulatory apparatus, situated within the cavity of the chest, giving origin to the arteries and receiving the termination of the veins. The human heart is conical, with its base on the median line of the body, its point directed downward, forward, and to the left, reaching nearly to the level of the cartilage of the sixth rib. The adult organ is about 5 in. long and 3½ in. thick, with an average weight of a little less than 10 oz.

The heart is inclosed in a membranous sac, the *pericardium*. This consists of two portions. First there is a large bag of fibrous tissue which is attached to the great vessels at the root of the heart and spreads out below into a sac of considerable size. This is the *parietal* layer of the pericardium, and incloses the heart, covered by a thin, smooth membrane, the *visceral* pericardium, which is reflected to the inner surface of the parietal pericardium, which it also lines. Thus there is formed a cavity, faced with a smooth serous membrane, which secretes a small quantity of clear fluid, and thus prevents friction in the action of the heart. The outer or parietal pericardium is in relation with the median surfaces of the lungs and below with the diaphragm, to which it is attached by a ligament.

In man and all the warm-blooded vertebrate animals the heart consists of two lateral halves, right and left, wholly separated by a partition; the right half receiving the venous blood derived from the general circulation and sending it to the lungs, the left half receiving the arterialized blood from the lungs and sending it into the arterial system, to be distributed throughout the body. Each half consists of two cavities communicating with each other, called respectively the "auricle" and the "ventricle." The auricle is the smaller and thinner, receiving the blood directly from the veins, while the ventricle is the larger and stronger, receiving the blood from the auricle and discharging it into the corresponding artery.

The descending or superior vena cava and the ascending or inferior vena cava empty their contents together into the right auricle, which in contracting forces the venous blood through the tricuspid valve into the right ventricle.



HEART AND LARGE BLOOD-VESSELS.

The tricuspid valve consists of three portions, as its name indicates, and is held in position by strong tendinous cords, running from its edge and under surface to the inner wall of the ventricle.

The pulmonary artery, carrying venous blood from the right ventricle, and the aorta, carrying arterial blood from the left ventricle, have each at their origin a valve formed by three half-moon shaped flaps, and called the semilunar valve. This shuts by the reaction of the blood sent into the arteries by the powerful closing of the ventricle. The pulmonary veins, carrying arterial or aërated blood from the lungs, empty into the left auricle, which opens into the left ventricle through the mitral valve, similar in general construction to the tricuspid, except that it has two cusps or sheets, and some resemblance to a bishop's miter.

The action of the heart consists in an alternate contraction (called systole) and relaxation (diastole), by which at one instant it receives the blood from the veins and at another propels it into the arterial system. In this process the two auricles, right and left, contract simultaneously; and the two ventricles subsequently contract, also at the same instant with each other. Still the auricular and ventricular contractions are not distinctly and separately alternate with each other, to

the same extent as the strokes of the two pistons of a force pump. The action of the heart rather consists in a single continuous contraction, which begins at the auricle and thence runs forward to terminate at the ventricle. The heart's action is always purely involuntary, and its persistency, especially in cold-blooded animals, is remarkable; it continues to beat in some cases for many hours after it has been removed from the animal.

Before birth the heart beats 140 to 150 times a minute, during the first year 125–135, during the third year 95–100, between the eighth and fourteenth years 85–90, in adult life about seventy-two, and in old age the pulse again becomes rapid. The position of standing, sitting, or lying has an effect on the rapidity of the pulse, since it influences the amount of work the heart has to do. The female pulse is more rapid than the male. The heart has three nerve ganglions in its walls which, respectively, drive the heart (motor ganglion), quicken its impulse (accelerating ganglion), and prevent it from beating too fast (inhibiting ganglion). The accelerators and pneumogastric nerves which have their rise at the base of the brain govern these ganglia. For if the pneumogastric nerve be cut, the uncontrolled action of the ganglion in the heart wall will produce a very rapid pulse. The quickened pulse due to disturbance of the nervous balance from any cause is familiar to all.

Heart, Diseas'es of the. The diseases of the heart are: (1) inflammatory affections; (2) organic diseases, or structural lesions; and (3) functional disorder. The inflammatory affections are distinguished according to the particular structure inflamed. Inflammation of the serous membrane which covers the organ and lines the heart sac (pericardium) is called pericarditis. Inflammation of the membrane lining the cavities of the organ (endocardium) is called endocarditis. Inflammation of the substance of the organ (muscular and connective tissue) is called myocarditis or carditis. The organic diseases or structural lesions relate, first, to the valves and orifices, and second, to the walls of the organ. Valvular lesions are generally seated in the left side of the heart, being either mitral or aortic, or both. The various changes produce their evil results chiefly in two ways, namely, by affecting the valves so as to render them more or less incompetent to perform their functions, and diminishing the size of the mitral or aortic orifice so as to produce more or less obstruction to the passage of blood.

The sound of the blood current passing through the narrowed opening or rushing back through the imperfectly closed valves can be distinguished by means of the stethoscope. Enlargement of the heart is of two kinds: from increase of muscular structure, and from increased size of the cavities. The first is called hypertrophy; the second, dilatation. Enlargement from hypertrophy is the result of an abnormal growth of the muscular structure, caused by undue exercise of the organ to overcome obstruction. Atrophy is the reverse of hypertrophy, the adult heart being sometimes reduced to 4½ oz. Fatty degeneration of the heart is a disease in which there is a substitution of fat for the muscular tissue; a replacement rather than mere deposit. This produces weakening, which may result in rupture. Dilatation involves weakness of the heart, and its ability to propel the blood through the arteries is lessened in proportion as the heart is dilated. Under functional disorders are embraced all kinds of disturbed action occurring irrespective of either inflammation or any structural lesion. A frequent form is palpitation, consisting of violent or tumultuous action, of which the patient is distressingly conscious, but which is really devoid of danger. Frequent intermittency of the heart's action is another form. Functional disorder usually causes great anxiety and apprehension, patients thinking that there must be organic disease. It may be caused by mental excitement and depression; by the immoderate use of tobacco, dyspeptic derangement, or improper habits; by gout, by anæmia, and by an irritable constitutional tendency. Counting from youth to age, not one person in a hundred has any disease or defect of the heart.

Hearts, a card game, usually played by four persons. The whole pack is dealt, each player holding thirteen cards. The first player leads, the rest follow suit, and the highest card of the suit wins the trick. When all thirteen tricks have been played, each player puts one chip in the pool, for each heart card he has taken. The pool is then divided as may be agreed; one chip may be drawn down by each player for each heart *not* taken by him in the game. If he has no hearts he takes thirteen chips, if five hearts eight chips, etc.

Heat, popularly, the state of a body that produces a certain well-known effect on the nerves of temperature, or, sometimes, a substance itself when in that condition (as when we say "the *heat* is coming from the register," meaning the hot air) or sometimes again the state of the organism when feeling the effect noted above, as when we say "my hand is *hot*" (meaning that its nerves register a sensation of higher temperature). Scientifically, heat is a form of energy possessed by material bodies or by the ether between them. When a body is able to produce the well-known sensation or effects of heat when touched, the heat is called *sensible*; when the energy is potential, the heat is called *latent*; when it is in transit from one body to another through space, it is called *radiant*. Heat was formerly supposed to be a substance in itself, to which the name "caloric" was given; it is now explained on the so-called dynamic theory, which supposes all bodies to be made up of molecules in motion. A body is "hot" or "cool" as the energy of this motion, which is due to the velocity of the molecules, is greater or less. The radiation of heat into space is merely the stirring up of waves in the ether—waves that are identical with those of light and with the electrical waves used in wireless telegraphy. Light waves are simply heat waves so short that they affect the eye: electrical waves are too long to affect any of the sense organs directly. On the re-

cent electric theory of matter, atoms are made up of electrons or electric particles, and the short light and heat waves are electric disturbances as truly as the longer "Hertzian" waves.

That heat is a form of energy was first shown between 1842 and 1849 by several independent investigators, notably by Dr. Mayer, a German physician, who proved it from theoretical considerations, and by Mr. Joule, of Manchester, England, who demonstrated practically that the apparent disappearance of a certain amount of mechanical energy always corresponded to the appearance of an equivalent of heat. Stated in numbers, 772 foot pounds of work correspond to a British heat unit (an amount of heat sufficient to cause a rise of temperature of one Fahrenheit degree in a pound of water). This number 772 is called the "dynamic equivalent" of heat English measures. The study of heat embraces (1) that of the passage of bodies from one state to another as heat is absorbed or given out and (2) that of radiant heat, or the passage of heat energy from body to body at a distance.

Bodies exist in three states, solid, liquid, or gaseous, according to the amount of heat that they contain. Heat given to a solid body raises its temperature until the melting point is reached, when the energy is entirely occupied in turning it into a liquid. When it has wholly liquefied, the temperature continues to rise until the boiling point is reached, when it again becomes stationary. After the substance has wholly vaporized, the temperature of the vapor may then rise indefinitely. During the processes of melting and vaporization, the heat communicated is said to become "latent." It appears again as the body cools, when it is condensing to liquid form, and when it is solidifying. Familiar examples of these phenomena are seen in the case of water, which, though liquid at ordinary temperatures, often assumes the solid form (ice) and the gaseous (steam). The fact that heat is a form of energy, convertible into other forms, is called the "first law of thermodynamics." It is a phase of the law of conservation of energy. The so-called "second law," which has been variously stated, is a phase of the law of "dissipation of energy" and expresses the fact that heat cannot of itself pass from a cooler to a hotter body. As enunciated by Clausius, it states that the capacity of a body for doing work by its heat is proportional to its *absolute temperature*. This is the temperature measured from a zero point representing the temperature of a body whose particles had come to rest among themselves.

All bodies are not increased by the same amount in temperature by an equal accession of heat. The number of heat units required to raise the unit of mass one degree represents what is called the *specific heat* of the substance in question. This is not a constant quantity, but generally increases somewhat with the temperature. Besides causing change of state, as mentioned above, heat causes most bodies to expand. The amount by which the length of a unit bar increases for a rise in temperature of one degree is known as the coefficient of expansion. This property of expansion is utilized for the measurement of temperature. The boiling point of a liquid is the temperature at which the change from liquid to gas occurs within the mass of the liquid itself, and depends on the pressure above the liquid surface. Water boils under ordinary atmospheric pressure at 212° F., but as the pressure is reduced, the boiling point is lowered.

Heat may pass from one place to another in three ways: *radiation*, by wave motion in the ether; *conduction*, by transfer of molecular motion from one point to another of the same substance or another in contact with it, and *convection*, or actual motion of the heated substance itself, especially in gases or liquids. Bodies may be good or bad conductors of heat; among the former are the metals; among the latter most liquids and gases. A liquid heated under very high pressure may assume a "critical" state in which it may be said to be in an intermediable condition between the gaseous and liquid states. A substance above the critical point possesses the properties of a gas except that it cannot be liquefied by increasing the pressure alone. Gases once regarded as unliquefiable were so because above the critical point at ordinary temperatures. By lowering their temperatures sufficiently they have now been liquefied under pressure. See FUEL; TEMPERATURE; SPECIFIC HEAT.

Heath, William, 1737–1814; American military officer; b. Roxbury, Mass.; was a farmer when he was appointed brigadier in the Continental army, June 22, 1775; and, August, 1776, became major general. He was stationed in the highlands near King's Bridge, N. Y., 1776; transferred to Boston, 1777; was again on the Hudson from 1779 till the close of the war; was the last surviving major general of the revolutionary army, and published his "Memoirs," 1798.

Heath, or Heath'er, common name of plants of the genus *erica*, which contains about 400

COMMON HEATH.

species. The greater number of species are natives of W. Africa, some of the W. portion of

Europe, a few of N. Europe, and one of N. America. While some of the African species form shrubs 8 or 10 ft. high, those of N. countries are low, much branched shrubs, seldom exceeding a foot. The genus *erica* comprises species of great beauty, even the most humble of them being attractive, and is the type of a large order, the *ericaceæ* or the heath family, noted for the showy character of many of its genera, about fifty in number including *rhododendron, azalea, kalmia, andromeda,* and others well known for the beauty of their flowers and highly prized as ornamental plants.

Heat'stroke. See SUNSTROKE.

Heav'en, the blue vault apparently overarching the earth; also the region of clouds; also the unknown and idealized regions above the first. The pagans assisted their conception of heaven as the abode of gods by imagining some mountain (Olympus with the Greeks, Mt. Meru with the Hindus) as towering above the clouds and sustaining the dwellings of the immortals. The Hebrews, however, rose above this material conception of heaven and recognized the omnipresence of God (Psalm cxxxix). Early mankind shrank from claiming a right, after death, of dwelling with the gods; and even in the Old Testament the dead are viewed as descending into the vague and joyless realm of sheol (Job x, 21-22) which conception the Greeks tempered to the "Elysian Fields," while the other races had their "happy hunting grounds," or "Isles of the Blessed." Occasionally, a hero or king might rise after death to be a god, in Olympus or Valhalla, but heaven was not regarded as the lot of common people. Probably under Persian influence the hope of immortality gradually developed among the Jews, until in the Christian conception the life after death is foreshadowed as a substantial and embodied reality, as a citizenship in a kingdom of redeemed mankind, with its eternal abode in a sphere of its own, a new earth, to which Christ has already ascended. Christ declares that the state of the risen dead shall be eventually one with that of the angels. While in the Apocalypse, the New Jerusalem, is described as coming down from heaven upon earth, here to abide, but pure, uncorruptible, and heavenly. See HELL; PURGATORY.

Heaves, or Bro'ken Wind, a disease of the horse, the nature of which is not well understood, though it is characterized by difficulty in the act of expiration, the horse making a spasmodic effort to expel the air from the lungs. The symptoms are best observed when the horse is exercised, the breathing becoming labored, the nostrils dilated, the eyes bloodshot, showing imperfect purification of blood in the lungs. A broken-winded horse has a bad hollow cough. When the animal is oppressed by work, the pulse is excessively rapid and the heart beats energetically. From this circumstance it is regarded by some as a disease of the heart. Low-bred horses are especially liable to broken wind if fed on innutritious and bulky food, and at the same time kept at hard work. The treatment is unsatisfactory, and we can only hope for palliation by keeping the alimentary canal in order, administering occasional purgatives, and feeding on a proper quantity of the best oats, which should always be bruised; also allowing the best hay in spare quantities—10 to 12 lbs. daily. The hay should be cut and wet. Fresh grass in its season is the proper food. Dusty hay and dry meal as food should especially be avoided.

He'be, in Greek mythology, the goddess of youth and the cupbearer and attendant of the Olympian gods. She was the daughter of Zeus and Hera, and the wife of Heracles.

He'ber, Reginald, 1783–1826; English bishop; b. Maefas, Cheshire; at age of seven had translated Phædrus into English verse; studied at Oxford; wrote his prize poem "Palestine," 1803; became rector of Hodnet, Shropshire, 1809; edited the works of Jeremy Taylor, with a life, 1819–22; consecrated Bishop of Calcutta, 1823, and until his death was occupied with the duties of his office. A complete collection of his hymns appeared, 1827. His "Narrative of a Journey through the Upper Provinces of India, from Calcutta to Bombay," was also posthumous.

Hébert (ā-bār'), Louis Philippe, 1850– ; Canadian sculptor; b. Ste. Sophie d'Halifax, Province of Quebec. He designed several public statues erected in Ottawa and Montreal; also executed several historical statutes for the legislative buildings in Quebec. In 1894 the government of Canada awarded him the Confederation medal.

He'brew, language belonging to the so-called Canaanitic branch of the Semitic languages. In richness and development it exceeds all other Semitic tongues except the Arabic. It is deficient in grammatical technicalities, especially in moods and tenses, and consequently somewhat in precision; but in euphony, brevity, and power it is hardly excelled by any language. In its full purity it appears in the earlier books of the Bible, in the mediæval poetry of Judah Hallevi, Eben Ezra, etc., and in the modern poems of Wessely and others. The prose writings posterior to the Babylonish captivity are generally tinged with Aramaisms, especially the Mishnah, while the mixed idiom of the Gemara may be termed Chaldaic. Three kinds of Hebrew alphabets are now in use: the square, also called the Assyrian (properly Babylonian), supposed to have been introduced by Ezra, the most common in print; the rabbinical or mediæval, used chiefly in commentaries and notes; and the cursive, in writing. The most ancient Hebrew, however, is believed to have resembled the Phœnician, and to be best represented by the Maccabean coins. The writing is from right to left. The alphabet consists of twenty-two letters or consonants, called *aleph, beth,* etc., the vowels being expressed by marks above or below the letters. There are no capital letters. The accents and marks of punctuation are very numerous.

Hebrews. See JEWS.

Hebrews, Epis'tle to the, an anonymous epistle of the New Testament; written by St. Paul, or, what is more probable, by one of his

disciples and companions under his inspiration (Luke, or Barnabas, or Apollos), and addressed to the Christians of Hebrew descent in the East. Its object is to show the infinite superiority of Christ over Moses, and of Christianity over Judaism, and to warn its readers against apostasy. The writer makes the Old Testament itself prove the New, to which it pointed as its fulfillment. He sets forth the eternal priesthood and sacrifice of Christ, of which the Levitical worship was a significant symbol and type. The ninth chapter furnishes the key to the understanding of the tabernacle and the temple. The doctrinal expositions are interwoven with solemn warnings and rich consolations in view of the heavy persecutions to which the readers were exposed from the unconverted Jews. The eleventh chapter contains a most eloquent sketch of the ancient heroes of faith for the encouragement of timid believers. It was written before the destruction of Jerusalem, when the temple worship was still in existence, probably in Italy during the first imprisonment of Paul in Rome, 63 or 64 A.D.

Hebrides (hĕb'rĭ-dēz), or **West'ern Is'lands,** common name given to the large group of islands stretching along the W. coast of Scotland numbering about 490, of which, however, only 120 are inhabited. The islands are divided into the Outer Hebrides, among which the most remarkable are St. Kilda, Lewis, Harris, N. and S. Uist, Benbecula, and Barra; and the Inner Hebrides, the principal of which are Skye, Eigg, Mull, Iona, Staffa, Ulva, Lismore, and Kerrera. Their area is estimated at 3,000 sq. m. Pop. (1900) 115,000. The islands are mentioned by Ptolemy and Pliny under the name of *Hebudes*, which by a misprint became *Hebredes*.

He'bron (originally *Kirjath Arba*; Arab., EL-KHULIL), city of Palestine, 18 m. S. of Jerusalem; stands partly on the declivities of two hills and partly in the deep and narrow valley of Mamre. At the S. extremity of the town is a mosque, which, according to the Arabs, covers the cave of Machpelah, with the tombs of Abraham, Isaac, and Jacob, and their wives. The architecture indicates its original use as a Christian church. Hebron became the residence of David, 1055 B.C., and the seat of a Latin bishopric, 1167 A.D.; was taken by Saladin, 1187, and after an insurrection stormed by Ibrahim Pasha 1834.

Hecatæus (hĕk-ă-tē'ŭs), Greek historian and geographer; b. in Miletus; d. abt. 476 B.C. He visited Egypt, Libya, Greece, Italy, and other countries; was the author of a geographical work containing a description of various countries in Europe, Asia, and Africa; and of a prose giving the mythical history of the Greeks. Some fragments of these works are extant.

Hecate (hĕk'ă-tē), mysterious Greek goddess, whose mythus is variously given. The old traditions make her one of the Titans, honored by the Olympian gods, whom she assisted against the giants. She is oftenest reckoned as one of the infernal divinities, of a most mysterious and terrible character. She was worshiped with gloomy sacrifices and magical rites.

Hec'atomb, strictly signifies the offering of a "hundred bullocks" in a sacrifice to the gods; but most commonly it designates the slaughter of a considerable number of animals of any kind. Sometimes the whole hecatomb, but more often the thighs, legs, and hides, were burned as a part of the ceremony, the flesh of the beasts being eaten by the worshipers.

Heck, Barbara, 1734–1804; the foundress of American Methodism; b. Ballygarry, Ireland, in a settlement of German emigrants from the Palatinate on the Rhine. In 1760 Philip Embury, Paul Heck, and Barbara his wife, with others of the settlement, sailed for New York. There the little company lapsed from their faith, or at least from their Wesleyan usages; but in 1776, Barbara recalled Embury to his duty as a Methodist local preacher; gathered a little congregation at his house; and rested not till she saw the famous "Old John Street chapel" completed. Methodism was thus effectively introduced into the U. S.

Heck'er, Isaac Thomas, 1819–88; American clergyman; b. New York City; joined in the Brook Farm experiment, 1843, and afterwards lived in a socialistic community at Fruitlands, Mass., and with Thoreau in his hermitage for a while; he became a Roman Catholic; joined the Redemptorists in Belgium, 1847; was ordained a priest, 1849; returned to the U. S., 1851; was released from the order of Redemptorists by the pope, 1857, and founded the Congregation of St. Paul the Apostle (commonly called Paulists), 1858. In 1865 he established *The Catholic World*; was Bishop Rosecrans's procurator at the Vatican Council, 1869; author of "Questions of the Soul," "Aspirations of Nature," 1857; "Catholicity in the United States," and "Catholics and Protestants Agreeing on the School Question."

Heckewelder (hĕk'ĕh-wĕl-dĕr), **John Gottlieb Ernest,** 1743–1823; Moravian missionary; b. Bedford, England; became an Indian missionary, 1762, laboring in Ohio, Pennsylvania, and Michigan, and a missionary agent for the Moravians, 1788, serving at times as U. S. Peace Commissioner with the Indians; chief works, "An Account of the History, etc., of the Indian Nations" and a "Narrative of the Mission of the United Brethren."

Hec'la, or Hek'la, volcano of Iceland; is conical in shape, 5,110 ft. high, covered with snow, and presents a dreary, desolate aspect. Fantastic groups of hills, craters, and lava, leading the eye to distant snow-covered jokuls, the mist rising from a waterfall, lakes encircled by bare, bleak mountains, an awful and profound stillness, and half darkness produced by the lowering clouds, give to the whole region a character of desolation scarcely to be paralleled. The last and most tremendous eruption was that of 1845–46, lasting seven

months, pouring out a stream of lava a mile broad and 50 ft. deep, and sending its clouds of dust 400 m. over the ocean, as far as the Orkney Islands.

Hec'tor, in Greek legend, the bravest hero of the Trojan army; son of Priam and Hecuba, the royal pair of Troy; celebrated by Homer in his "Iliad"; distinguished himself by his defense of the wounded Sarpedon, his fight with the Telamonian Ajax, and by other exploits; slew Patroclus, the friend of Achilles, and was slain by the latter, who dragged the dead body behind his chariot three times around the tomb of Patroclus, and thereafter three times around the walls of Troy, but finally restored it to Priam, at the command of Zeus. His parting words to his wife Andromache, on going to the war, will ever be famous.

Hecuba (hĕk'ū-bā), in Greek legend, the second wife of Priam, King of Troy, and the mother of Hector, Paris, Cassandra, Creüsa, and fifteen other children. According to Euripides, she was enslaved after the capture of Troy, and carried to the Thracian Chersonesus, where she revenged herself on King Polymestor, who had killed her son Polydorus, by tearing out his eyes and slaying his two sons.

Hedge'hog, any small insect-eating mammal of the genus *Erinaceus*, a group containing about a score of species; found in Europe, Africa, and the greater part of Asia. Hedgehogs resemble one another very closely in general appearance, having pointed heads and the upper part of the body and head clothed with sharp spines. By means of a complicated

HEDGEHOG.

system of muscles lying just beneath the skin these little animals can, when attacked, curl into a ball of bristling points. The food of hedgehogs consists principally of insects, but they also eat small reptiles and, to some extent, fruit, eggs, and young birds. The most familiar species, the European hedgehog (*E. europæus*), is about 9 in. long. The term hedgehog in the U. S. is a common name for the Canada porcupine (*E. dorsatum*).

Hedge Schools, name given in derision to the schools conducted by the priests in Ireland in the eighteenth century, when the laws prohibited instruction in the Catholic faith, or by Catholic priests, under pain of death. These schools were held "on the hillside, in the ditches, and behind hedges, in the precarious shelter of the ruined walls of some ancient abbey, or under the roof of a peasant's cabin."

Hedge War'bler, called also **Hedge Spar'row,** or **Hedge Accen'tor.** See ACCENTOR.

Hedin (hā-dēn'), **Sven Anders,** 1865– ; Swedish geographer and explorer; b. Stockholm; educated at Stockholm, Upsala, Berlin, and Halle, devoting himself to natural science, especially geology. His first journeys of exploration (1885–86) were into Persia and central Asia; while member of King Oscar's embassy to Shah of Persia (1890) he explored Kashgar; supported by King Oscar he made a series of explorations in central E. Asia, 1893–97. In 1899 he further investigated the Lob-Nor region and attempted to reach Lhassa, but was turned back by the Tibetans. Received great honors from the king on his return in 1902. He made another journey into Tibet in 1908. Knighted, 1909.

Hedjaz (hĕj-äz'), **El,** partly sandy, partly stony region of Arabia, extending along the coast of the Red Sea, from Yemen to the Syrian desert. As both Mecca and Medina, the two holy cities of the Mohammedans, are situated in this region, it is annually traversed by thousands of pilgrims. It constitutes with Yemen a vilayet of the Turkish Empire; area about 96,500 sq. m. Pop. (1908) 300,000.

He'donism, doctrine that we perform all acts of will with happiness in view. In ethics the name Hedonists is given to a class of thinkers who hold that all morality can be reduced to the pursuit of happiness, either individual or general. Hedonists are distinguished from Eudæmonists only in that the latter recognize the more refined and ideal forms of happiness in opposition to lower or physical pleasures and pains.

Hefele (hā'fĕh-lĕh), **Karl Joseph von,** 1809–93; German prelate; b. Unterkochen; professor extraordinary at Tübingen, 1837, and, 1840, Ordinary Prof. of Church History, Archæology, and Patrology in the Roman Catholic faculty; in 1869 was made bishop of Rottenburg, Würtemberg. His edition of the "Apostolic Fathers," "Review of Wessenberg's Church Councils," "History of the Christian Councils," and "Contributions to Church History," etc., gave him wide fame as a profound scholar. He was a member of the Vatican Council, and voted with the minority against papal infallibility.

Hegel (hā'gĕl), **Georg Wilhelm Friedrich,** 1770–1831; German philosopher; b. Stuttgart; after holding tutorships at Berne and Frankfort, became, 1801, a lecturer in the Univ. of Jena, and published his first important work, "On the Difference between the Philosophical Systems of Fichte and Schelling"; was made Prof. Extraordinary of Philosophy, 1806; but

on the approach of the French, 1807, repaired to Bamberg, where he edited a political newspaper; published, 1807, the "Phenomenology of Spirit," in the preface to which he attacked the "immediate intuition" of Schelling, whose follower up to that time he had been; had charge of a gymnasium at Nuremberg, 1808–16; published, 1812–16, his "Science of Logic," presenting in it the science of pure thought or the fundamental basis of his entire system.

He was Prof. of Philosophy at Heidelberg, 1816–18, and published "Encyclopædia of the Philosophical Sciences"; succeeded Fichte in the chair of philosophy at Berlin, 1818; published his "Philosophy of Rights," 1821; other works include "Philosophy of History," "Æsthetics," "Philosophy of Religion," and "History of Philosophy." His entire system may be regarded as the philosophy of civilization, or as the demonstration of the personality of the Absolute and an exhibition of His revelation in the world of time and space. It completely identifies logic with metaphysics. Many of his followers interpret his doctrines pantheistically, and regard his system as the most comprehensive and analytic of all the pantheistic systems.

Hegira (hē-jī'rā). See HEJIRA.

Heiberg (hē'bĕrkh), **Johann Ludvig,** 1791–1860; Danish author; b. Copenhagen; Prof. of Danish Language and Literature at the Univ. of Kiel, 1822–25; became poet and translator at the Royal Theater, Copenhagen, 1829, and sole director, 1849; works include "Concerning Human Freedom," in support of the Hegelian philosophy; the vaudevilles "King Solomon and Jörgen the Hatter" and "April Fools"; the national romantic drama "The Elves's Hill"; the critical essay, "Concerning the Vaudeville as a Branch of Dramatic Art." He established, 1827, *Copenhagen's Flying Post*, a journal which exercised a great influence on Danish literary taste.

Heidelberg (hī'dĕl-bĕrkh), town in the grand duchy of Baden, on the Neckar; 54 m. S. of Frankfort on the Main; has one of the oldest and most celebrated universities of Germany (founded 1356), having about 1,400 students; zoölogical museum, botanical garden, and observatory. The old castle, built in the twelfth century, forms a very interesting and picturesque ruin. In the cellar is the famous "Heidelberg cask," which holds 236,000 bottles. The manufactures comprise tobacco, madder, ultramarine, and other dyestuffs; optical, surgical, and musical instruments; paper, Portland cement, and leather; and its trade, especially in wine, is extensive. At an early period the city was a fief of the Bishop of Worms, till Count Otho, of Wittelsbach, 1228–53, made it the capital of the Palatinate, which it continued to be for nearly five centuries. In 1720 Charles Philip removed his court to Mannheim. Pop. (1905) 49,527.

Heilprin (hīl'prĭn), **Angelo,** 1853–1907; American naturalist; b. Satoralja-Ujhely, Hungary; removed to the U. S., 1856, soon afterwards returning to Europe for education; became Prof. of Invertebrate Paleontology at the Philadelphia Academy of Natural Sciences, 1880; curator in charge of the museum, 1883–92, and Prof. of Geology at the Wagner Free Institute of Science, 1885–90; leader of the Peary relief expedition, 1892; made observations at the crater of Mont Pelée, Martinique, after the great eruption of 1902. His scientific works include "Contributions to the Tertiary Geology and Paleontology of the United States," "The Geographical and Geological Distribution of Animals," and "The Geological Evidence of Evolution."

Heimdall (hīm'däl), in Scandinavian legend, the watchman of the Asas, or gods; son of Odin by a mother of the Jotun race. He has golden teeth, rides a horse with a golden mane, can see by night as well as by day, and beholds everything within a hundred leagues. He can hear the growing of the grass, and even that of the wool on sheep. He dwells in the bright Himinbjorg, at the place where the rainbow bridge enters heaven. When danger approaches he blows the great trumpet Gjallar-horn so loudly that the whole universe can hear.

Heine (hī'nĕ), **Heinrich,** 1799–1856; German poet and wit; b. Düsseldorf; was of Jewish parentage; went to Berlin to study law, and there, 1822, published his first book, a volume of poems; lived at Göttingen, 1823–25, and took his degree; returned to Berlin; published two tragedies, "Almanzor" and "Radclif," and "Pictures of Travel," 1826–31, which ridiculed the weaknesses of the social, political, and literary life of his time. His "Book of Songs," 1827, containing most of his earlier poems, made him the most widely read author in Germany, though much of his success was owed to a studied and most clever imitation of popular songs. From 1827 to 1831 Heine resided partly in Munich, where he edited "Political Annals" with Lindner; partly in Berlin. His "Kahldorf on the Aristocracy," 1831, was so democratic in its utterances that he deemed it wise to leave the country, and he removed in that year to Paris, where he resided with short interruptions until his death, and, 1836–48, was pensioned by the government. Here he published a satire, "Germany: A Winter's Tale," "Contributions to the History of Recent Belles-Lettres in Germany," "Alta Troll," a poem; "The Romantic School," and other works.

Heinsius (hīn'sē-ŏs), **Antonius,** 1641–1720; Dutch statesman; b. Leyden; was Grand Pensionary of the Netherlands from 1689 until his death; was, if not the creator, a most energetic promoter of the grand alliance between Great Britain, Holland, Hanover, Denmark, Prussia, Austria, and Savoy against Louis XIV, and to him, as the real soul of the alliance, Louis XIV made overtures of peace, 1708, 1709, 1710. The sacrifices he demanded of France prevented the carrying out of the negotiations. He was the last of the allies to sign the Peace of Utrecht.

Heintzelman (hīnt'sĕl-mĕn), **Samuel Peter,** 1805–80; U. S. army officer; b. Manheim, Pa.;

graduated at West Point, 1826; served principally on the N. frontier and in the Florida War; in the Mexican War was breveted major, 1847; as brigadier general of volunteers commanded the forces which captured Alexandria, Va., May 24, 1861, and took part in the first battle of Bull Run. In the Virginia Peninsular campaign of 1862, commanded the Third Army Corps before Yorktown, and at the battle of Williamsburg; as major general of volunteers, commanded the Third Corps at Fair Oaks, and in the "Seven Days'" fight; at the second battle of Bull Run, was engaged; also present at Chantilly; in command of the defenses of Washington, 1862–63, and of the Twenty-second Army Corps, 1863; commanded the Northern Department, embracing the states of Ohio, Michigan, Indiana, and Illinois, 1864; subsequently on court-martial duty; breveted brigadier general and major general U. S. A., for gallant conduct in battle; retired, 1869, as major general.

Heir, in law, one entitled by descent and right of blood to lands, tenements, or other hereditaments. The title to real estate may pass by purchase and by descent. It is by purchase when it is transferred by gift, grant, or conveyance, to take effect in the owner's lifetime or by will, and it is by descent when, by reason of his dying intestate, it passes to such relative as the law then designates to succeed to his real property. Such real estate immediately upon the death of the ancestor vests in the heir; whereas personal property must go through the hands of an administrator before it reaches the next of kin. The word heir is sometimes applied to anyone to whom property of any description is to pass on the death of its owner, but in a legal sense no one is heir to personal property. An heir apparent is one who must be the heir if he survive the owner. An heir presumptive is one who, if things do not change, will be the heir at the owner's death. See DESCENT.

Heji'ra, or Hegi'ra, the term applied to the prophet Mohammed's secret escape from Mecca to Yatreb. In 635 A.D., under the Caliph Omar, an assembly of the principal companions of Mohammed determined to adopt the year in which the Hejira occurred as year 1 of the Mussulman chronology. There is now consequently an annual difference of about ten days twenty-one hours forty-eight minutes between the Christian and Mussulman years, and exact reduction of Christian to Mussulman dates, or vice versa, is a complicated matter. Where absolute exactness is not required, thirty-three Christian may be considered equivalent to thirty-four Mussulman years.

Hel, in Norse legend, the goddess of the dead; daughter of Loke and Angerboda. She dwelt in Niflheim, under one of the roots of Ygdrasil, the mystic ash tree. She rules over nine worlds in Niflheim. Her home is called Helheim, and the way thither, Hel-way, is long; its course is always downward.

Hel'der, The, fortified town of the Netherlands; province of N. Holland, on the Marsdiep, which separates the mainland from the island of Texel, and at the N. terminus of the N. Holland Canal; 51 m. NNW. of Amsterdam. The great dike of the Helder forms for 5 m. an artificial coast barrier. The government of Holland maintains here a naval establishment, with dry docks, etc. The naval victory of the Dutch under de Ruyter over the English was won here, August 21, 1673. Pop. (1907) 26,838.

Hel'en, in Greek legend, a princess celebrated for her beauty; daughter of Leda (wife of Tyndareos, King of Sparta), whom Zeus had visited in the shape of a swan. Pollux was her twin brother. She was sought in marriage by all the young men of rank in Greece, and finally was given to Menelaus, who thus became King of Sparta, by whom she had a daughter, Hermione. She was abducted by Paris, son of Priam, who had gone to Greece to get the wife promised him by Aphrodite in return for the apple of discord. This brought on the Trojan War, because all her former suitors had agreed to defend Menelaus against anyone who should injure him in his marital relations. Helen assisted the Greeks in the capture of Troy, and returned with her husband to Sparta. After his death she was banished by her stepsons, and fled to Rhodes, where she was hanged by the queen, Polyxo, because, in causing the war, Helen had brought about the death of Polyxo's husband. After her death Helen was married to Achilles in the island of Leuce, and bore to him a son, Euphorion.

Hel'ena, Saint, abt. 248–328; mother of Constantine the Great; said to have been the daughter of an innkeeper; b., according to some accounts, in Bithynia, according to others, in Britain; was married to the Emperor Constantius Chlorus, who for reasons of state divorced her, 292; but her son, Constantine the Great, on succeeding to the throne, 306, treated her with great honor, and conferred on her the title of Augusta. After her conversion to the Christian faith she made a pilgrimage to Jerusalem, where, it is said, she discovered the sepulcher of the Savior, and the real wood of the cross on which he suffered; also the burial place of the Magi. For her many virtues and charities she was subsequently canonized by the Church. Her festival is observed, August 18th.

Helena, capital of the State of Montana and of Lewis and Clarke Co.; in Prickly Pear Valley, 15 m. W. of the Missouri River; 115 m. N. of Virginia City; is the seat of Montana Wesleyan Univ. and St. Aloysius College; has an insane asylum, several public libraries, planing mills, machine shops, manufactures of lumber, carriages, harness, bricks, tiles, soap, liquors, etc.; an assay office, smelters and concentrators; is on the site of the famous Last Chance Gulch placer mine, and is surrounded by productive mines of gold, silver, iron, lead, copper, and zinc. Helena was settled as a mining camp, 1864. Pop. (1906) 16,770.

Hele'na, St. See ST. HELENA.

Hel'enus, in Greek legend, a son of Priam and Hecuba, twin brother of Cassandra, and, like her, endowed with prophetic powers. He deserted to the Greeks, and declared that Troy could not be taken without Neoptolemus and the arrows of Hercules, which the former possessed. After the fall of Troy he became the slave of Neoptolemus, and induced him to settle in Epirus. After Neoptolemus had been killed by Orestes, Helenus became king of a portion of Epirus. He married Andromache, Hector's widow.

Heliade (hēl'ē-ăd), **Jean** (or, more properly, ELIADE RADULESCU, IOAN), 1802–72; Rumanian writer; b. Tergovist, Wallachia; became a professor in a college at Bucharest, 1822; published a "Rumanian Grammar," 1828; established "The Rumanian Courier," the earliest of the Roumanian literary periodicals, 1829; translated works from Italian, French, and English; became a member of the revolutionary government, 1848, and was obliged to go into exile; returned to Bucharest, 1854; other works include a poem on Michael the Brave, the national hero, and "Mircea," a drama.

Helianthus (hē-lĭ-ăn'thŭs). See SUNFLOWER.

Hel'icon, Mount, mountain of Greece, in Bœotia; between the Gulf of Corinth and Lake Copais; is strictly a continuation of Parnassus; highest point is a cone 5,000 ft. high. Helicon was sacred to Apollo and the Muses, probably because Hesiod the poet lived at Ascra, near its foot. Near Ascra was Aganippe, the fountain of the Muses. Higher up was the grove of the Muses. Still higher up was the well Hippocrene and the fountain of Narcissus. These points are identified.

Hel'igoland, or Hel'goland, small island in the North Sea; opposite to and about 40 m. from the mouth of the Elbe; is about a mile long from N. to S., one third of a mile wide, and about 3 m. in circumference. The inhabitants are mainly of Frisian descent, engaged in fishing and piloting, though many have turned their attention to accommodating visitors who resort here for the fine sea bathing. Heligoland was captured from Denmark by Great Britain, 1807, and was ceded to Germany, 1890, and fortified by the latter power.

Heliodorus (hē-lĭ-ō-dō'rŭs), Greek writer of romance; b. Emesa, Syria; flourished toward the end of the fourth century A.D.; wrote "Æthiopica" in ten books, describing the loves of Theagenes, a Thessalian youth, and Chariclea, daughter of a king of Ethiopia. This was for centuries an exceedingly popular romance.

Heliogabalus (hē-lĭ-ō-găb'ă-lŭs). See ELAGABALUS.

Heliog'raphy, a method of signaling between distant points by means of a movable mirror, used to reflect the sun's rays from one station to another, and called a heliotrope, or heliograph. The most common form is that represented in the figure, where a mirror, movable in any direction, is mounted near the eye end of a telescope. The telescope is pointed at the distant station, and the mirror turned so as to reflect the sun's light through the two openings in the sights, which will occur when the shadow of the rear one is seen on the front one. The heliotrope was invented in 1821 by Gauss, who used it as a signal in measuring angles. Its use for this purpose is now universal on long lines. A line 192 m. long has been run in California by using a mirror of 77 sq. in. area. Common heliotropes used on lines under 50 m. long have mirrors about 2 sq. in. in area. The heliotrope requires clear weather, and the best time to use it is the hour before sunset. On lines as short as 20 m. it is used even in a hazy atmosphere, when a target cannot be seen. By placing and removing an object before the mirror long and short

HELIOTROPE.

flashes are made, by which messages can be transmitted. See SIGNAL SERVICE.

Heliometer (hē-lĭ-ŏm'ē-tĕr), instrument first invented to measure the diameter of the sun in seconds and parts of seconds, but now employed to measure small arcs generally on the celestial sphere; consists of an ordinary telescope equatorially mounted, the object glass of which is cut into two equal semicircles, which slide along the diameter of section by the revolutions of a very fine screw. Each half of the objective forms a separate image of any object at which the telescope is pointed. If there are two objects the screw and telescope may be turned until one image of one object coincides with the opposite image of the other. The amount of motion to produce the coincidence determines the angle between the objects.

Heliop'olis (Syria). See BAALBEC.

Heliopolis, sacred city of Egypt, near the apex of the Delta region, 5 m. NE. of Cairo. According to Manetho it existed in the second dynasty. In the period previous to the twelfth dynasty it is seldom mentioned, but at that time Usertasen I signified the completion of a Temple of Ra by erecting obelisks before it. Only one of these is still *in situ*, the sole remaining memorial. Four obelisks erected by

Thothmes III are now in Constantinople, Rome, London, and New York (Central Park). The city was most flourishing under Rameses III, when the temple is said to have had 12,913 attendants. The final destruction came in the Arabian period, and late excavations have brought little to light. Heliopolis was one of the holiest of Egyptian cities, and the oldest chapters of the Ritual of the Dead are said to have been written there. The earliest records indicate that it was at first the seat of the worship of the Mnevis bull (second dynasty). Previous to the twelfth dynasty it was sacred to Tum, and afterwards it was the special seat of the sun worship—*i.e.*, of Ra under various forms and names.

He'lios. See HELIUS.

He'liostat, mirror carried by a clockwork mechanism, so contrived as to reflect a beam of solar light in an unvarying direction, notwithstanding the apparent change of place of the sun in its diurnal motion. The heliostat has long been in use in physical investigations and experiments, without possessing a high degree of precision. More recently it has been employed in aid of astronomical observation, for which purpose it has been greatly improved.

Heliotrope (hē'lĭ-ō-trōp), name of annual or perennial plants belonging to the natural order *Boraginaceæ*. They are readily propagated from cuttings of tender shoots, and great numbers are raised annually by florists for sale as bedding plants; though it is a shrub, small plants from the unripe wood will flower freely. The

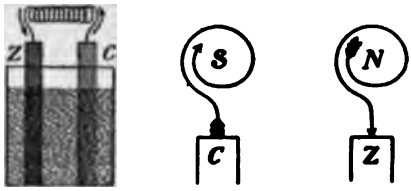
HELIOTROPE.

odor of the heliotrope is compared by some to that of vanilla; in England it is frequently called "cherry pie," on account of its fragrance. Pliny and Dioscorides assert that the flowers of the heliotrope turn toward the sun, whence its ancient and generic name. For the same reason it has also been called turnsole and girasole. Also an instrument used in signaling by means of the sun's rays. See HELIOGRAPHY.

He'lium, gaseous element, originally discovered by Prof. William Ramsay, of London, in the mineral cleveite, and subsequently found in about thirty other minerals. Its density, after purification, was found to be 2.133. Determinations of the wave length of sound in the purified gas gave, as the ratio between the specific heats, the figure 1.632, and finally, after further experiments, 1.652, the theoretical figure for a monatomic gas being 1.66. According to Ramsay, "the results of these experiments go to prove that the density of the gas named helium is not less than 2.13, and that it has the same claim to be considered a monatomic gas as mercury gas; or if it be a mixture, it must be a mixture of monatomic gases." The spectrum was examined by Sir William Crookes, who found the line D_3 to be its most characteristic feature. Its refractive index was found by Lord Rayleigh to be 0.146, the lowest yet reported. In addition to its original sources, helium is now recognized as a constituent of certain spring waters and of the air. It was liquefied in 1898.

He'lius (the SOL of the Romans), in Greek mythology, the god of the sun, the son of Hyperion and Theia, and the brother of Selene (Luna) and Eos (Aurora). He gave light both to gods and to men. In later times he was frequently confounded with Apollo, though originally they were quite distinct. Temples of Helios existed in Greece at a very early period, and subsequently his worship was established in Corinth, Argos, the island of Rhodes, and various other places. Among the animals sacred to him the cock was preëminent. Helios was usually represented as riding in a chariot drawn by four horses.

He'lix, curve having the form of a cork screw, generated by the motion of a point which moves uniformly around a cylinder and at the same time moves along its axis. If the



HELIX.

copper wire which connects the carbon and zinc terminals of a cell is made into a helix curve as shown in the illustration, the electric current will develop a magnetic field. A helix with an iron core is called an electromagnet.

Hell, Maximilian, 1720–92; Hungarian astronomer; b. Schemnitz; was principal astronomer at Vienna, 1756–92; published the annual "Ephemerides Vindobonenses," 1757–86. He went to the North Cape to observe the transit

of Venus, 1769, and published his observations, which were believed to be more or less spurious until 1883, when Prof. Simon Newcomb, the American astronomer, examined the original manuscripts and discovered that, owing to partial color blindness, Hell had been mistaken in his conclusions.

Hell, originally the state of the dead without distinction of character or destiny; called Sheol by the Hebrews and Hades by the Greeks. The associations of burial, the sinking sensation accompanying the failure of strength and the ideas of gloom connected with the dead, combined to suggest the interior of the earth as their dwelling place. With the Germanic tribes the region of Hela was one of darkness and frost. An approach to the idea of retribution is found in Isaiah xiv, 9, 10, where the King of Babylon is described as received in Sheol with jeers. Among the Greeks flagrant offenders are described as suffering torments in Tartarus, the dungeon of Hades. Deliverance from Sheol is distinctly taught in Dan. xii, 2, 3, and, later, the righteous dead were assigned to a special compartment of Hades, known to the Jews as Abraham's bosom, or paradise (Luke xvi, 19–31; xxiii, 43). The rest of Hades then became the abode of the unrighteous dead, a "Gehenna of eternal fire."

The question whether the Bible teaches that the sufferings of the wicked in hell after the day of judgment are to be absolutely endless, or whether, from the disintegrating processes of a being at discord with itself, these issue in ultimate extinction, or whether the Scriptures open glimpses of hope, implying a possible restoration of all the lapsed men and angels to holiness and unity with God, has commonly, in the Church, been answered in the first sense, although not merely Origen, but at least two great theologians and canonized saints, Gregory of Nazianzus and Gregory of Nyssa, favor the hope of universal restoration. On the other hand, such declarations as those in Matt. xii, 31, 32; xxvi, 24, are hard to reconcile with the doctrine of a universal restoration.

Roman Catholic theology, whose doctrine of future things is peculiarly determinate, includes in hell all regions of the spiritual world which are not within the range of the beatific vision, comprising in it, therefore, the *limbus infantum* for unbaptized children, even when conceived as a place of "perfect natural beatitude," including the natural knowledge and love of God. Nor does it seem indisposed to admit purgatory as a part of hell, though destined to disappear after the judgment, as being occupied only by elect souls, whose admission to heaven cannot be deferred beyond that point. See HEAVEN; PURGATORY.

Hel'las. See GREECE.

Helle (hĕl'ē), in Greek legend, daughter of Athamas; king of Bœotia; was persecuted by her stepmother Ino, and was about to be sacrificed by her father when her mother, Nephele (the name means *cloud*), descended from heaven and placed Helle and her brother Phrixus on the back of Chrysomallus, the ram with the Golden Fleece, who went with them through the air, but Helle fell off and was

PHRIXUS ATTEMPTING TO SAVE HELLE.

From a wall painting in the Naples Museum.

drowned in the Hellespont, which was named from her.

Hel'lebore, remedy used especially by the ancients in cases of insanity; was the root of *Helleborus orientalis*, an herb of the family *Ranunculaceæ*. The black hellebore of modern pharmacy is chiefly the product of *H. niger* (which produces the flower called Christmas rose). Its properties are shared by *H. viridis* and *fœtidus*. These are all Old World species, and have violent cathartic properties. Hellebore is not now much used in medicine.

Hel'len, son of Deucalion and Pyrrha, and the progenitor of the whole *Hellenic* nation, though Hesiod and Archilochus were the first to call the Greeks *Hellenes*. Hellen had three sons, Dorus, Æolus, and Xuthus. He was succeeded in the Kingdom of Phthia by Æolus, whose descendants were the Æolians. Dorus settled in Doris on the slopes of Parnassus, and his descendants emigrated to the Peloponnesus. Xuthus settled in Attica, and by his sons Ion and Achæus became the progenitor of the Ionians and Achæans.

Hellenes (hĕl'ēnz). See GREECE.

Hel'lenist, among the Jews of Palestine and other countries in the Roman period, and among the Jewish Christians of the same times, a name applied to the proselytes to Judaism of Greek or other foreign ancestry, and also to Jews living outside of Palestine who had adopted Greek, usually in some dialectical form, for their common tongue, and had also more or less yielded to Greek civilization. The latter class when living outside of Palestine were known as the "Jews of the Dispersion."

The word is also applied to a person, usually a foreign scholar, who is an authority on Greek language, literature, and history.

Hellenis'tic Greek, Greek language as it appears in the Septuagint (283–185 B.C.), the New Testament, the writings of Josephus and Philo, and those of some of the early Christians. It abounds in Hebrew and Aramaic forms, idioms, and even words.

Hellenop'olis (originally *Drepanum* or *Drepane*, now HERSEK), Bithynian city on the Sea of Marmora, near the Draco River; was so named by the Emperor Constantine the Great, probably because it was the birthplace of Helena, his mother.

Hel'ler, Joseph, 1798–1849; German author; b. Bamberg; made extensive art collections, and wrote a history of the art of wood engraving, a manual for collectors of etchings, and biographies of Lucas Cranach, Dürer, and other masters.

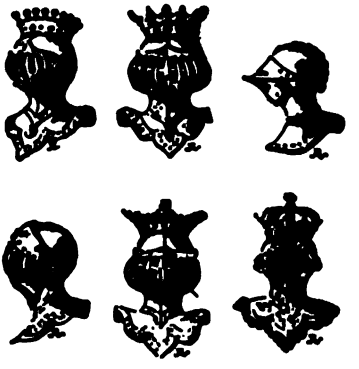
Heller, Stephen, 1814–88; Hungarian pianist; b. Pesth; in 1836 came under the notice of Schumann, who greatly encouraged him; went to Paris, 1837, where he remained for the rest of his life, devoting himself to composition and teaching. His compositions, almost entirely for the pianoforte, are very beautiful, but his fame rests chiefly on his numerous studies, which are in constant use by piano students all over the world.

Hel'lespont, ancient name of the Dardanelles, the strait which connects the Sea of Marmora and the Ægæan; named from the old legend of Helle, according to the ancients. Being the highway to Constantinople, it is strongly fortified, and men-of-war of European nations are not allowed to enter it, even in time of peace.

Hell Gate, name given to the turbulent channel of the East River, New York City, just N. of Blackwell's Island, lying between Astoria and Manhattan Island, and Astoria and Ward's Island, where the river makes a sharp and dangerous turn. The name in its present form sufficiently indicates the former character of this channel; but this name is merely a corruption of the old Dutch name, which meant a "beautiful passageway," in allusion to the picturesque scenery of the place. A ledge of rocks, projecting for some distance from the Long Island shore under the channel and rising at certain points almost to the surface of the water, formed at times such a seething and eddying current as to send terror to the hardiest of its navigators. The U. S. Govt., 1870, decided to free the channel of these obstructions, and engineers under the direction of Gen. John Newton were engaged for six years drilling the principal rocks and charging them with nitroglycerin, and in the summer of 1876 the whole mass was exploded. In 1885 a much larger area was undermined and blown up, at the place known as Flood Rock. Little Hell Gate is the strait which divides Ward's Island on the N. from Randall's Island.

Helm, on shipboard, the steering apparatus, including wheel, tiller, and rudder. To *put down the helm* is to bring the ship's head to the wind; to *put up the helm* is the reverse. By means of the wheel the rudder is inclined to an angle varying from the ship's course, until by the action of the water on the rudder the ship's direction is properly modified. The rudder was originally on the right side of the vessel, which was therefore known as the starboard, or steerboard, side; the left side being called the port, or, formerly, the larboard side.

Hel'met, in ancient times the metallic or leathern headdress worn by soldiers. The Assyrian helmet, as shown by the monumental sculptures, had the form of a close-fitting skullcap, round or conical, and sometimes surmounted by a crest. The Greek helmet, often made of bronze, was in its general form very much like the Assyrian, but it was usually much more profusely decorated. Along the ridged prominence on the cone was often fastened a flowing crest of horsehair, and sometimes the lower part was so prolonged as to cover not only the neck, but even parts of the shoulder. The Roman helmet was simpler—a plain undecorated skullcap. It generally left the face uncovered, the shield being used to protect the face and throat.



VARIOUS FORMS OF HELMETS.

The mediæval helmet was often of a very fantastic shape, and ornamented with symbolical representations (eagles, lions, etc.). The closed form gave way, after the fourteenth century, to the *morion*, a kind of steel hat with a brim. Helmets of various forms are still employed to some extent in different nations. Helmets of forms varying according to the bearer's rank appear upon coat armor beneath the crest. This is a comparatively recent innovation in heraldry.

Helm'holtz, Hermann Ludwig Ferdinand von, 1821–94; German physiologist, physicist, and mathematician; b. Potsdam; was a military surgeon until 1847; taught anatomy in the Berlin Academy of Art, 1848–49; Prof. of Physiology at Königsberg, 1850–55; of Anatomy and Physiology at Bonn, 1855–58; of Physiology at Heidelberg, 1858–71; Prof. of Physics and director of the physical laboratory at Berlin, 1871–87; head of the great physico-technical institute for research at Charlottenburg after 1887. Announced the invention of

the ophthalmoscope, 1851; made important discoveries in acoustics; published "The Conservation of Force," "Handbook of Physiological Optics," "Theory of the Impressions of Sound," etc.; was ennobled, 1883. His son ROBERT d. 1889; physicist; published papers of note, particularly in the domain of the physics of gases.

Helmstedt (hĕlm'stĕt), town; duchy of Brunswick, Germany; 24 m. ESE. of the city of Brunswick; has a great name in Church history, as its university, founded 1575 by Julius, Duke of Brunswick, and suppressed by Jerome Bonaparte, 1809, was the seat of that form of Lutheranism which, originating from Melanchthon, or at least developing under his influence, sought a reconciliation with the Reformed Church. Pop. (1900) abt. 15,000.

Heloder'ma, a genus of lizards, of the family *Helodermatidæ*, having the head and rest of the body covered with rounded scales, suggestive of small nail heads. The tongue is fleshy and slightly forked, the teeth are grooved and connected with the outlets of very largely developed salivary glands. The color is orange yellow, with irregular black markings, the brilliancy of coloration varying according to surrounding conditions and the time that has elapsed since the shedding of the epidermis. There are two species, *H. horridum*, from N. Mexico, and the Gila monster (*H. suspectum*), from Arizona, New Mexico, and Texas. They are sluggish in their movements, and feed to a considerable extent on birds' eggs. They are the only known venomous lizards, although the extent to which they are poisonous doubtless is dependent on the conditions under which the bite was inflicted. The poison does not attack the nerve centers, but acts on the heart, producing paralysis of that organ.

Heloise', or **Eloise** (ā-lō-ēz'). See ABELARD.

He'los, town of Laconia, near the mouth of the Eurotas; founded by Helius, the youngest son of Perseus; defended itself with great stubbornness against the Dorians, who after conquering it took revenge by making all its inhabitants slaves; hence the name Helots for the Spartan serfs or state slaves, who were hired out to citizens, but might not be sold or emancipated. Its site is not precisely known.

He'lots, the third and lowest class in ancient Sparta; the serfs of the state. They were divided among the *Spartiatæ*, or highest class, by lot, and tilled their lands, paying to their masters a fixed portion of the harvest. They also served in war in various humble capacities. The *Crypteia* was an organized guard over the Helots by young Spartans, made necessary by the great numbers of the former (twice as many at least as all other classes together) and their general uneasiness.

Hel'singfors, capital of the Grand Duchy of Finland; on the Gulf of Finland. Its fortifications stretch over a row of seven rocky islands. Helsingfors has a university (removed from Åbo, 1827) attended by about 2,700 students, a military academy, and considerable trade. The principal articles of export are lumber, paper, and butter. The city was founded by Gustavus I of Sweden in the sixteenth century, and the majority of the inhabitants are still Swedish in race and speech. It is defended by the fortress of Sveaborg. Pop. with Sveaborg (1906) 124,637.

Helvetian (hĕl-vē'shăn), or **Helvet'ic, Repub'lic,** name of the state established in place of the Swiss Confederation after the French conquest, 1798, and maintained till March 10, 1803. See SWITZERLAND.

Helvetii (hĕl-vē'shĭ-ī), ancient Celtic inhabitants of W. Switzerland. Cæsar's "Commentaries" give a graphic account of their attempt to occupy more fertile parts of Gaul, and of their terrible punishment and subjugation by the Romans, 58 B.C. Previously (107) they had met and defeated a Roman army, and had accompanied the Cimbri in their invasion of Italy, but made good their retreat after the defeat by Marius (101). In 70 A.D., refusing to recognize Vitellius, and taking the part of Galba, they were severely punished by the former. In later times they scarcely appeared as a separate people.

Helvétius (ēl-vā-sē-üs'), **Claude Adrien,** 1715–71; French philosopher; b. Paris; became farmer general, 1738; a little later chamberlain to the queen's household; acquired a large fortune; retired, 1751, to an estate at Voré, in La Perche; published, 1758, his celebrated work, "On the Mind," which had great influence on morals in France, but was condemned by the court, the Jesuits, and the bishops, and was burned by order of Parliament. Other works include "Man, his Faculties and his Education."

He'mans, Felicia Dorothea (BROWNE), 1794–1835; English poet; b. Liverpool; married Capt. Hemans, 1812; from 1818 resided in Wales, Lancashire, and Ireland, engaged chiefly in literary production. Her best poetry is characterized by grace and tenderness. Her works include "Early Blossoms," "The Domestic Affections," "The Forest Sanctuary," "Records of Women," "Songs of the Affections." "The Landing of the Pilgrims" is one of her best-known poems.

Hematemesis (hĕm-ă-tĕm'ē-sĭs), vomiting of blood, or hemorrhage from the stomach; the result chiefly of ulcer of the stomach, cancer of the stomach, or extreme inflammation or congestion of the stomach, as when caused by corrosive irritants, excess of alcoholic drinks, or serious diseases of the liver. Hematemesis is treated by perfect rest on the back, cold packs over the stomach, and bits of ice swallowed.

Hematite (hĕm'ă-tīt), or **Spec'ular I'ron Ore,** one of the most common ores of iron, distinguished by its color into red and brown hematite; does not attract the magnet. These ores are composed chiefly of peroxide of iron, and are very important sources of metallic iron.

Hemicra'nia. See MIGRAINE.

Hemi'na, L. Cassius, Roman historian of the second century B.C., whose work in at least

four books began with the founding of Rome, and included the second Punic War.

Hemiplegia (hĕm-ĭ-plē'jĭ-ā). See PARALYSIS.

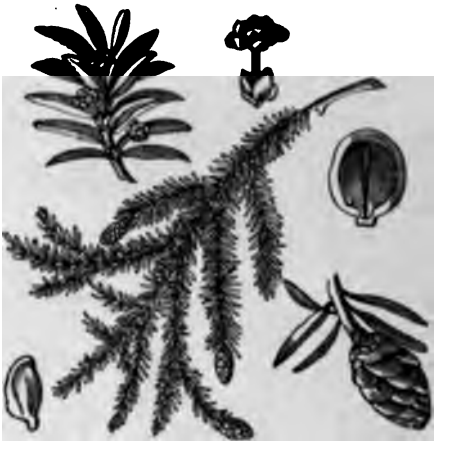
Hemiptera (hē-mĭp'tē-rā), order of insects named from the fact that in many of them the front pair of wings are horny on the front half and membranous behind. They all have beaks shaped to pierce the animals or plants on which they feed. The family includes all those insects to which the common name "bug" is properly applied. These are divided into two families, the *Homoptera* including cicadas, leaf hoppers, plant lice, and scale insects, and the *Heteroptera*, including water skaters, water scorpions, rear-horses, bedbugs, etc. Lice are sometimes also regarded as of the *Hemiptera*.

Hem'lock, or Spot'ted Hemlock, a biennial plant (*Conium maculatum*), family *Umbelliferæ*, native in Europe, naturalized and cultivated in the U. S. It has an erect, round, branching stem from 3 to 6 ft. high, marked

HEMLOCK.

with brownish-purple spots, whence the name "spotted hemlock." It bears large deep-green, decompound leaves, and small white flowers in compound terminal umbels. The plant, especially in summer, has a peculiar fetid, mousy smell. Its leaves are used in medicine as a sedative, hypnotic, and anodyne, their powers being due to a special alkaloid conine, which depresses the action of the motor nerves. In overdoses, hemlock produces paralysis. With this drug Socrates and Phocion were poisoned. Stimulants and emetics are the best antidotes.

Hemlock Spruce, or Hemlock Tree (so called from the resemblance of its branches to those of the hemlock plant), the *Tsuga*, or *Abies canadensis*, one of the most common of the coniferous trees of the N. states and British America. It is a very large tree, and when



HEMLOCK SPRUCE.

young is very graceful. Though the timber is coarse and cheap, it is very serviceable, and immense quantities of it are employed in house carpentry in the older and longer settled parts of N. America. The bark and its extract are very extensively employed in tanning leather in the U. S. "Hemlock oil" is distilled from its leaves and twigs, and "Canada pitch" is obtained from the old trees.

Hemoglo'bin, Hematoglob'ulin, or Hematocrys'tallin, a substance found in venous blood. It is formed by abstracting oxygen from Oxyhemoglobin, either by pumping or by treating with reducing agents. In the arterial blood which has been aërated in the lungs, the hemoglobin is in combination with oxygen, as oxyhemoglobin, which gives the crimson color. In venous blood the "reduced hemoglobin" causes the dark color.

Hemorrhage (hĕm'ŏr-rāj). See BLEEDING OR HEMORRHAGE.

Hemorrhoids (hĕm'ŏr-roidz). See PILES.

Hemp, fiber, the use of which in Persia and India antedates the period of accurate knowledge, and the introduction of which into Europe was contemporaneous with civilization. This fiber is similar to that of flax, but coarser and stronger. The plant which produces it is also known as hemp, and is cultivated for its seed and for the oil which is expressed from the seed. The hemp of warm countries, especially of India, possesses peculiar medical prop-

erties. (See HASHISH.) The plant is known botanically as *Cannabis sativa*, and is an annual belonging to the nettle family. It has in different plants the fruit-bearing or female flowers, and the sterile or male flowers. Hemp grows 4 to 12 ft. high, and makes its growth almost as rapidly as Indian corn.

The leading hemp-producing countries of the world are Russia, Turkey, India, Holland, Germany, Italy, and Great Britain. Large quantities are also grown in the Philippine Islands. The Riga hemp of Russia combines fineness and strength, and is the best. There is, however,

STAMINATE AND PISTILLATE FLOWERS OF HEMP.

a kind produced in Italy called "garden hemp," raised with care by hand culture, which is the finest. The fiber is separated from the boon much as flax is, and is spun and woven in almost identically the same way. Excellent sheetings and shirtings, white and strong, are made from hemp, and towelings (huckaback), osnaburgs, tablecloths, napkins, floorcloths, sail duck, and the like, are manufactured on a large scale, and form articles of extensive commerce. By far the greatest consumption of the fiber is for rope, cordage, and twine. Hempseed is largely consumed as food for cage birds and fancy poultry. It contains about twenty-five per cent of oil, which is of a greenish-yellow color, and is used in the manufacture of certain soaps and somewhat in paints and varnishes.

Hen. See POULTRY.

Hen'bane, plant, generally biennial, though sometimes annual; family *Solanaceæ*, native in Europe, but naturalized in the U. S., growing in waste places in the N. and E. states. The root somewhat resembles that of parsley, and poisoning has resulted from eating it by mistake. The stem is erect, round, branching, from 1 to 4 ft. high; the leaves numerous, large, deeply sinuate, sea green, and both leaves and stem viscid and hairy. The flowers are yellow, beautifully veined with purple. The whole plant has a rank, offensive smell. The leaves and seeds are used in medicine the active principle being an exceedingly poisonous alkaloid, *hyoscyam*: which may be obtained in colorless needlelike crystals.

Hen'derson, Alexander, 1583–1646; Scottish ecclesiastic; b. Creich; is credited with having a large share in drafting the "National Covenant" and with the authorship of the famous "Solemn League and Covenant"; other chief work, "The Order and Government of the Church of Scotland."

Henderson, James Pinckney, 1808–58; American diplomatist; b. Lincoln Co., N. C.; became a brigadier general under the Republic of Texas, 1836; subsequently Attorney-general and Secretary of State there; minister to Great Britain to procure recognition of the republic and to the U. S. to negotiate annexation; first governor of the new state; major general Texan Volunteers in Mexican War; was U. S. Senator at time of death.

Hen'dricks, Thomas Andrews, 1819–85; American statesman; b. near Zanesville, Ohio; accompanied family to Shelby Co., Ind.; admitted to the bar at Chambersburg, Pa., 1843; Member of Indiana State Constitutional Convention, 1850; of Congress, 1851–55; commissioner of General Land Office, 1855–59; Democratic U. S. Senator, 1863–69; elected Governor of Indiana, 1872; defeated as candidate for Vice President of the U. S. on ticket headed by Samuel J. Tilden, 1876; elected Vice President on ticket headed by Grover Cleveland, 1884.

Hengest, or **Hengist** (hĕng'gĭst), d. 488; prince of the Jutes, who, 449, with Horsa, his brother, landed with 300 followers at Ebbsfleet on the Isle of Thanet, and was employed by Vortigern, King of Britain, to repel the Picts and Scots. This the Jutes accomplished by aid of fresh reënforcements from the Continent, but soon turned their arms against the Britons, whom they overcame in a series of bloody wars. Horsa was slain at Æglesthrep, 455; Hengest declared himself King of Kent, 457, and repeatedly defeated the Britons in battle (465–473). The existence of Hengest and Horsa has been questioned by modern critics.

Hengstenberg (hĕng'stĕn-bĕrkh), **Ernst Wilhelm,** 1802–69; German theologian; b. Fröudenberg, Westphalia; became Prof. of Old Testament Exegesis at Berlin, 1826; soon acquired a commanding influence in the Church by establishing the *Evangelische Kirchenzeitung*, 1827, the organ at first of the Evangelical, then of the High Church Lutheran Party in the Church and the conservative aristocratic party in the state; most celebrated of his works, "Christologie des Alten Testaments." His "Commentar über die Psalmen" is regarded as a masterpiece of orthodox exegetical theology.

Hen'le, Friedrich Gustav Jakob, 1809–85; German physiologist; b. Fürth, Bavaria; became Prosector to the Medical Faculty of the Univ. of Berlin, and afterwards was professor successively at Zurich, Heidelberg, and Göttingen; most important work, "Handbuch der Rationellen Pathologie." His employment of the

achromatic microscope for anatomical purposes opened a wide and interesting field of observation.

Hen'ley, William Ernest, 1849–1903; English author and editor; b. Gloucester; edited *London*, 1877–78; the *Magazine of Art*, 1882–86; the *Scots Observer*, afterwards the *National Observer*, 1888–93; and the *New Review* after 1894. He was the author of "A Book of Verses," "Views and Reviews," "Song of the Sword," "The Centenary Burns," with T. F. Henderson; "Works of Lord Byron," "English Lyrics," "The Poetry of Wilfrid Blunt," with George Wyndham, and "London Types," with W. Nicholson.

Henley on Thames (hĕn'lĭ ŏn tĕmz), municipal borough of Oxfordshire, England; on the left bank of the Thames; 36 m. W. of London; has a noted five-arch bridge built 1786; is principally engaged in brewing; and is best known for the amateur regattas held here annually since 1839.

Hen'lopen, Cape. See CAPE HENLOPEN.

Hen'na, or **Alkan'na,** paste made from the leaves of *Lawsonia inermis* or of *L. spinosa*, mixed with catechu, and used in the East to stain the nails, the finger tips, and the edges of the eyelids of women and the beards of men; primarily gives an orange color, which, if desired, may be changed to black by adding other stains. Some species of *Hibiscus* are in E. Asia put to the same use. The use of the henna for dyeing the nails, the inner surface of the hands, and the soles of the feet was of very early date in Egypt, as is proved by the mummies.

Hen'nepin (Fr., ĕn-păn'), **Louis,** abt. 1640–abt. 1706; Franciscan missionary and explorer; b. Ath, Flanders; became a missionary to Canada, 1675; was (1679–80) a member of La Salle's memorable band of explorers, who traversed the Great Lakes and the upper Mississippi and its tributaries; returned to Europe, and soon afterwards published "Description de la Louisiane," a valuable work, though full of exaggerations, and "Nouvelle Découverte D'un Très Grand Pays," which contains his previous work, enlarged by a narrative of a voyage down the Mississippi to its mouth, the falsity of which was exposed by Jared Sparks in his "Life of La Salle." In later life Hennepin abandoned the habit and the obedient life of his order, though still claiming the title of Récollet missionary.

Hennequin (ĕn-kăn'), **Alfred,** 1842–87; French dramatist; b. Liège, Belgium; was educated as a civil engineer, and practiced his profession first on the Belgian state railways, later as manager of one of the tramway systems in Paris; early began to write plays; produced in Brussels, under the pseudonym "Alfred Lebrun," two comedies: "J'attends Mon Oncle" and "Trois Chapeaux"; in Paris made a hit with "Le Procès Veauradieux," and thereafter entirely abandoned his profession for play writing. He wrote alone or in collaboration "Les Dominos Roses," "Bébe," and "Nounon," with Émile Najac; "La Femme à Papa," with Millaud; "La Corbeille de Noces," "La Vente à Tata," "Ninetta," "Cherchez la Femme"; excessive production led to softening of the brain, from which he died.

Henner (ĕn-ā'), **Jean Jacques,** 1829–1905; French figure and portrait painter; b. Bermviller, Alsace; studied in Paris; grand officer of the Legion of Honor, 1903; works include "The Bather Asleep," "Byblis Turned into a Spring," "Christ Entombed," "The Magdalen."

Hen'ningsen, Charles Frederick, 1815–77; Anglo-American army officer; an English soldier of Scandinavian extraction; b. England; served successively in the Carlist army in Spain; in the Russian army in Circassia; in the Hungarian War of 1848–49; in Walker's filibustering expedition to Nicaragua; and in the American Civil War as a brigadier general in the Confederate army; superintended the manufacture of the first Minié rifles made in the U. S.; published works describing his experiences in Spain and Russia, and several novels.

Henotheism (hĕn'ō-thē-ĭz m), term defined by Max Müller, with whom it originated as "a belief and worship of those single objects, whether semitangible or intangible, in which man first suspected the presence of the Invisible and the Infinite, each of which was raised into something more than finite, more than natural, more than conceivable, and then grew in the end to be an *Asura* or living thing, a *Deva* or a bright thing, and *Amartya*, that is, not a mortal, and at last an immortal and eternal Being—in fact, a God, endowed with the highest qualities which the human intellect could conceive at the various stages of its own growth." This, according to Max Müller, is the "general name for the earliest form of religion among the Vedic Indians" (Hindus).

Henri (ăn-rē') **I,** King of Haiti. See CHRISTOPHE, HENRI.

Henriquez (ĕn-rē'kĕth), **Francisco Fernandez de la Cueva.** See FERNANDEZ DE LA CUEVA HENRIQUEZ.

Henriet'ta An'na, 1644–70; Duchess of Orleans; daughter of Charles I of England and Queen Henrietta Maria; was carried to France while an infant and reared by her mother in a convent at Chaillot; was married to Philip, Duke of Orleans, brother of Louis XIV, 1661; became celebrated for her powers of fascination and was the delight of the French court, but an object of aversion to her husband. In 1670 the king induced her to visit her brother's court, and through her influence England was detached from the alliance with Holland and Sweden which had been formed in opposition to the interests of France. Shortly after her return she died suddenly in great suffering, and in the belief that she had been poisoned.

Henrietta Mari'a, Queen of England, 1609–69; b. Paris; was the youngest child of Henry IV of France by his second wife, Maria de' Medici; on March 30, 1625, was married at Paris by proxy to Charles I; acquired great influence over her husband, but became ob-

noxious to the English nation by her partiality for the Catholic faith, and by her participation in the strife between Charles and the Parliament. In 1642 she went to Holland, and having procured money and troops joined her husband at Oxford; 1644 narrowly escaped being taken prisoner by Essex, and sailed to France, where she suffered from the effects of the hardships she had undergone, and lived in retirement.

Hen'ry, name of sovereigns of England, France, Germany, and Portugal. Here arranged according to the alphabetical order of the respective countries.

HENRY I of England (styled BEAUCLERC on account of his learning), 1068–1135; b. Selby, Yorkshire; son of William the Conqueror and Queen Matilda, and successor of William Rufus; assumed the crown (1100) while his brother Robert was absent in Palestine; at once recalled Anselm, declared the validity of the Confessor's laws, and married Maud of Scotland, shrewdly securing the Church, the English, and the Scots against Robert; was acknowledged Duke of Normandy, 1106, having defeated Robert, and soon engaged in advantageous wars with France. The drowning of his son William, 1120, and the troubles with his nephew William in Normandy, and with the Welsh in the W. of England, greatly disturbed the last of his reign. Died at Rouen, leaving as his heir his daughter, the Countess Matilda of Anjou, former wife of Henry V of Germany.

HENRY II, 1133–89; first Plantagenet King of England; b. Le Mans, Maine, France; son of Geoffrey Plantagenet and Matilda, former Empress of Germany, the heiress and only surviving child of Henry I; in 1152 invaded England with troops for the overthrow of King Stephen, with whom, 1153, a peace was concluded by which Henry was acknowledged as heir to the crown; succeeded Stephen, 1154, having, 1151, become Count of Anjou, Touraine, and Maine by his father's death; and by his marriage, 1152, with Eleanor of Aquitaine, the divorced Queen of France, acquired sovereignty over nearly half of France. The great events of Henry's reign were the Irish conquest; the wars with the Scots, Welsh, and the French king; the destruction of more than 1,000 feudal castles in England; the contest with Thomas à Becket; the subscription to the Constitutions of Clarendon, 1164; and the rebellion of his sons and queen.

HENRY III, 1207–72; b. Winchester; succeeded John, his father, 1216. Henry's minority at his accession, and the great power acquired by the barons under King John, crippled his authority and made his reign a weak one. Simon de Montfort, Earl of Leicester, was the great leader in the task of recovering for the nobles the privileges lost under Henry II, and by giving representation to the boroughs, formed the nucleus of the House of Commons. This was not accomplished, however, without a civil war, in which the king was defeated and captured at Lewes, 1264. De Montfort was defeated and slain in the following year by Prince Edward and Gloucester at Evesham. Henry waged war with France, and was defeated by Louis IX; succeeded by his son, Edward I.

HENRY IV, 1367–1413; first Lancastrian King of England; b. Bolingbroke; son of John of Gaunt, the fourth son of Edward III, while his mother was a lineal descendant of Henry III; was made Earl of Derby and Duke of Hereford; with his adversary, the Duke of Norfolk, was banished, 1398, by Richard II, who seized his immense estate on the death of John of Gaunt, 1399. Soon Henry landed at Ravenspur, Yorkshire, with a small following, the king being absent in Ireland. All England joined Henry, and Richard was dethroned and Henry crowned. His defective title led him to persecute the Lollards, so as to win the support of the Church, but his reign was much disturbed by formidable rebellions.

HENRY V, 1387–1422; b. Monmouth; son and successor of Henry IV; served in his youth against the rebellious Glendower and Hotspur; came to the throne, 1413, persecuted the Lollards, and, 1415, invaded France, basing his claim to its sovereignty on the strength of Edward III's claim; took Harfleur, September 22, 1415; totally defeated the greatly superior force of the French at Agincourt, October 25th, in one of the notable battles of history; occupied the greater part of France, aided by the Duke of Burgundy and other malcontents; married, 1420, the French Princess Catharine, and was recognized as heir presumptive. The remainder of his reign was largely occupied by wars in France.

HENRY VI, 1421–71; last Lancastrian King of England; b. Windsor; son of Henry V; succeeded his father, September 1, 1422, and, 1431, was crowned King of France at Paris. His reign was marked by the wars of the Roses. The weakness of the king was largely responsible for the rebellion headed by Jack Cade. In France Joan of Arc and her followers had expelled the English, and the popular sense of disgrace vented itself on the unoffending king whose title was indeed defective. Perhaps the best of Henry's work was in founding Eton School, 1440, and King's College, Cambridge, 1443, and in building the great chapels which are among the glories of English architecture. He was found dead in the Tower, where he had been imprisoned.

HENRY VII, 1456–1509; first of the Tudor kings of England; b. Wales; was descended, on his mother's side, from John of Gaunt (son of Edward III) and Catharine Swynford, whose offspring had been legitimatized by the pope, the king, and the Parliament. His father was a son of Owen Tudor, a Welsh gentleman, and Catharine, widow of Henry V of England, whose marriage to Tudor has been denied. Young Henry became Earl of Richmond; was attainted by the Yorkists, 1461; and, 1471, retired to France; attempted a revolt, 1483; landed at Milford Haven, 1485; defeated and killed Richard III at Bosworth; married Elizabeth, heir of the Yorkist sovereigns, 1486, thus uniting the houses of York and Lancaster. His reign was much disturbed by insurrections.

HENRY VIII, 1491–1547; second of the Tudor

monarchs of England; b. Greenwich; son and successor of Henry VII; became, 1502, Prince of Wales on the death of his brother Arthur; married Catharine of Aragon, Arthur's widow, 1509; succeeded to the crown, 1509; joined the Emperor Maximilian in a war with France, 1511–14, during which war the Scots were utterly overthrown at Flodden, September 9, 1513; made Wolsey chancellor, 1515; was involved in competition with Francis I and Charles V for the imperial crown of Germany; wrote, 1521, his book on the sacraments against Luther, for which he received from the pope the title of "defender of the faith"; and made war, 1522, against France in the interest of Charles V. He applied in vain, 1528, to the pope for a commission to inquire into the legality of his marriage, and, 1529, by Cranmer's advice, to the universities with better success.

The influence of the king and Wolsey at Rome was completely foiled by the Spanish interest in the queen's behalf, and the great seal was taken from Wolsey and given to Sir Thomas More. The Convocation was now compelled to acknowledge Henry as the head of the English Church; the king married Anne Boleyn, 1533, and the following year Parliament declared the former marriage with Catharine invalid, at the same time declaring that the succession should lie with the issue of the marriage of Henry with Anne Boleyn. As this act was not assented to by More and Fisher they were executed, Thomas Cromwell made vicar general, and the visitation and destruction of monasteries began. Anne Boleyn was executed on a charge of unfaithfulness, and Jane Seymour was married to the king, 1536; Roman Catholic insurrections broke out, 1536, and Queen Jane died, 1537; Anne of Cleves was married to the king, 1540, soon after which Cromwell was executed, and the marriage annulled by Convocation and Parliament; Henry married Catharine Howard in the same year, and had her executed, 1542; and was married, 1543, to Catharine Parr. Many Roman Catholics, and Reformers as well, were executed during the latter part of Henry's reign, and great numbers of the nobles and aristocracy died on the scaffold on suspicion of treason.

HENRY I of France, 1005–60; succeeded Robert II, his father, 1031; was a weak prince, whose reign was much disturbed by civil wars and public calamities. Died at Vitri, and was succeeded by Philip I, his son.

HENRY II, 1519–59; married Catharine de' Medici, 1533; succeeded Francis I, his father, 1547. His reign was distinguished by persecutions of the Protestants, and by wars with Charles V and his son, Philip II of Spain. These wars were at first advantageous to France, but afterwards the French were disastrously defeated at Naples, at St.-Quentin, and Gravelines, and by the disastrous peace of Cateau-Cambrésis, 1559, Henry gave up the greater part of his advantages. Died in consequence of a wound received in a tournament.

HENRY III, 1551–89; b. Fontainebleau; third son of Henry II and Catharine de' Medici; served as Duke of Anjou against the Huguenots, 1569–73; elected King of Poland, 1573; abandoned Poland, and succeeded his brother, Charles IX, as King of France, 1574. His reign was disturbed by the wars of the league, designed to prevent the succession of Henry IV, and is further memorable for the assassination of the Guises, 1588. Henry was stabbed to death by Jacques Clément, a partisan of the Guises. He was the last of the Valois line.

HENRY IV, 1553–1610; King of France and Anjou, the first Bourbon monarch of France; b. Pau; son of Antoine de Bourbon and Jeanne d'Albret, Queen of Navarre; in 1569 joined the Protestant army under Coligny; in 1572, after the peace of St.-Germain, and just before the massacre of St. Bartholomew, married Margaret of Valois, sister of Charles IX, and was compelled to abjure his faith. He had just succeeded to the crown of Navarre, but was detained at court until 1576, when he escaped and put himself at the head of the Protestants. In 1584 Francis of Anjou died and Henry became heir presumptive to the crown. In 1585 he was excommunicated by Sixtus V, and declared incapable of the succession. Then followed the "war of the three Henrys," 1586–87, the murder of Henry III, 1589, the claim of the Cardinal of Bourbon to the throne, the battle of Ivry, 1590, the siege of Paris, the Spanish invasion under Parma, and a long and varied war, in which Henry, with small means and the ineffectual support of the English, performed prodigies of valor and activity. In 1590 Henry professed the Roman Catholic faith; in 1594 was anointed king at Chartres; entered Paris, and in the course of four years had expelled the Spaniards and brought all France to subjection. In 1598 he published the Edict of Nantes and restored toleration. Henry was murdered by one Ravaillac, a fanatic.

HENRY I of Germany (THE FOWLER), 876–936; King of Germany and Duke of Saxony; succeeded his father, Otho I, as duke, 912; elected to succeed Conrad I, 919; carried on wars with Lorraine (which he conquered, 923–925), with the Hungarians, the Slavi, Danes, etc. He is reckoned as Henry I in the line of German emperors, but never bore the imperial title, except in consequence of having been saluted *imperator* by his troops, in the old Roman fashion.

HENRY II, 972–1024; Emperor of Germany; the last of the Saxon line of German monarchs, known also as THE LAME; succeeded to the duchy of Bavaria, 995; was elected King of Germany, to succeed Otho III, 1002; carried on wars in Poland, and with vassals in Germany, and with Italy and France, etc.; erected Hungary into a kingdom, 1007; was crowned emperor of the Romans, 1014; was canonized, 1152, on account of his zeal for the Church, and is honored July 15th.

HENRY III, 1017–56; Emperor of Germany (surnamed THE OLD, THE BLACK, or THE PIOUS); b. Osterbeck, in the Low Countries; was elected king, 1026, and succeeded Conrad II, his father; ruled with the greatest dignity and success, managed the affairs of Church and state alike; was crowned emperor, 1039;

compelled Hungary, Bohemia, Apulia, and Calabria to acknowledge themselves as vassals of the empire; built many churches and cathedrals.

HENRY IV, 1050–1106; Emperor of Germany; son of Henry III; was king when but three years old, and succeeded Henry III, his father, 1056. His reign was a long series of bloody contests with vassals at home and with Pope Gregory VII in Italy, who at the period of Henry's lowest fortunes compelled him to sue at Canossa for absolution, 1077. After many years of warfare in Germany he compelled the pope to retire, under the protection of Robert Guiscard, to Salerno, 1084. Henry was dethroned and imprisoned by his son Henry V, 1105, but escaped, and died at Liège.

HENRY V, 1081–1125; was crowned king and colleague of his father, Henry IV, 1099; deposed his father, 1105; was crowned emperor, 1111. His reign was much disturbed by discussions with the popes regarding investitures, and he was four times excommunicated. A compromise was reached in the important Concordat of Worms, 1122, in which the advantage rested with the pope. Wars at home and with Flanders, Hungary, and Poland vexed Germany during his reign. He married Matilda, daughter of Henry I of England. He was the last of the Salic line.

HENRY VI, 1165–97; surnamed THE CRUEL; succeeded Frederick Barbarossa, his father, 1190. His reign was much disturbed by Italian wars, and is famous for the imprisonment of Richard Lionheart at Trifels. Died at Messina, poisoned, it was supposed, by his wife.

HENRY VII, 1262–1313 (HENRY OF LUXEMBURG); was elected King of the Romans, 1308; invaded Italy at the head of a Ghibelline army; received the iron crown of Lombardy, 1311; was crowned emperor 1312; was poisoned it was supposed, while receiving the Eucharist.

HENRY, DOM, of Portugal, 1512–80; cardinal; King of Portugal; third son of Emanuel the Fortunate; was educated for the Church, and 1532, was made Archbishop of Braga; when he ascended the throne he held three archbishoprics—namely, those of Braga, Lisbon, and Coimbra—besides the immensely wealthy abbacy of Alcobazar. In 1539 he was made grand inquisitor of Portugal, and it was he who introduced the Inquisition into the Portuguese colonies. In 1545 he was made a cardinal. He ascended the throne of Portugal, August, 1578; succeeded by Philip II.

Henry (surnamed THE LION), 1129–95; b. Ravensburg; Duke of Saxony and Bavaria; son of Henry the Proud; succeeded to the duchy of Saxony, and, 1156, made good his claims to Bavaria; by conquest became the most powerful of German princes and the rival of the Emperor Frederick. His desertion of the latter in the war against the Lombard League was one of the causes of the defeat at Legnano 1176. Refusing to obey the emperor's summons to appear before the Diet at Worms 1177, he was placed under the ban, stripped of his possessions, and withdrew to England, but regained a portion of his dominions by an agreement with Frederick's successor, Henry VI.

Henry the Nav'igator, 1394–1460; fourth son of King John I of Portugal; b. Oporto; greatly distinguished himself at the conquest of Ceuta, 1415; was afterwards placed at the head of African affairs; fixed his residence at Sagres, in Algarve, near Cape St. Vincent, where he established a school of navigation in which a number of young Portuguese noblemen were educated. Every year he sent out expeditions of exploration. In 1418 the Madeira Islands were discovered; 1440, Cape Blanco, on the coast of Guinea, was reached. From this school issued that movement of maritime discovery and commercial enterprise which placed the Portuguese people at the head of European civilization for more than half a century, and whose two greatest results were the discovery of America and the discovery of the water route to India around the Cape of Good Hope. The introduction of the compass and the astrolabe was due to him.

Henry, Caleb Sprague, 1804–84; American author; b. Rutland, Mass.; became a Congregational minister, 1828; 1834 established the "American Advocate of Peace"; 1835, took orders in the Protestant Episcopal Church in New York, and soon after was appointed Prof. of Intellectual and Moral Philosophy in Bristol College, Pennsylvania. In 1837 he became a founder of the *New York Review*, and, 1839, Prof. of Philosophy and History in the New York Univ. His works include "Cousin's Psychology," "Compendium of Christian Antiquities," "Moral and Philosophical Essays," a translation of the Abbé Bautain's "Epitome of the History of Philosophy," "Dr. Oldham at Greystones, and his Talk There," and "About Men and Things."

Henry, Joseph, 1797–1878; American physicist; b. Albany, N. Y.; 1826, was appointed Prof. of Mathematics in the Albany Academy; 1827, began a series of experiments in electricity, and, 1828, published an account of various modifications of electro-magnetic apparatus. He was the first to magnetize a piece of iron at a distance, and invented the first machine moved by the agency of electro-magnetism. In 1831 he transmitted signals by the electro-magnet through a wire more than a mile long, causing a bell to sound at the farther end of the wire. He pointed out the applicability of this discovery to the instantaneous conveyance of intelligence between distant points by means of a magnetic telegraph several years before such a telegraph was brought into practical operation by Morse. In 1832 he was appointed Prof. of Natural Philosophy in the College of New Jersey at Princeton; and was secretary of the Smithsonian Institution at Washington from its organization, 1846, till his death. His discoveries in physics were numerous; author of "Contributions to Electricity and Magnetism" and many papers in scientific periodicals.

Henry, Matthew, 1662–1714; English Biblical commentator; b. Broad Oak, Wales; was ordained at Chester, 1687, where he remained till 1712, when he removed to Hackney; is chiefly remembered for his "Exposition" of the Bible, 1710, often reprinted, and still very highly esteemed.

Henry, Patrick, 1736–99; American lawyer and statesman; b. Studley, Hanover Co., Va.; son of Col. John Henry, magistrate and school teacher, a native of Aberdeen, Scotland, and a nephew of the historian Robertson; married the daughter of an innkeeper, and for a time assisted his father-in-law; after failing as a farmer and as a merchant, was admitted to the bar, after six weeks' study, 1760. For three years he obtained no practice, when his triumphant plea for the people's rights in the celebrated "Parsons' cause" won him immense applause and popularity. In 1765 he introduced into the conservative or passive House of Burgesses his famous resolutions against the Stamp Act, which he carried through by a majority of one after a stormy debate, in which he exclaimed, "Cæsar had his Brutus, Charles I his Cromwell, and George III" (here he was interrupted by cries of "Treason!") "may profit by their example. If this be treason, make the most of it." Thenceforward, he was the acknowledged leader of the friends of freedom in Virginia.

In 1769 he was admitted to practice in the General Court, where his distinguished ability as a speaker won him a fortune, for, though never of more than respectable legal knowledge, he possessed a marvelous power over the feelings of juries. He was the first Speaker of the General Congress at Philadelphia, 1774. In 1775, in the Virginia Convention, was delivered his most famous speech, that in favor of his resolution for putting the colony into a state of defense. In 1775 he was for a time a colonel of militia, and, 1776–79, was governor of the state, and again, 1781–86. In 1788 he opposed the ratification of the Federal Constitution as inconsistent with the sovereignty of the states. In 1794 he left public life, and afterwards declined the secretaryship of state, the mission to France, and the governorship. He was elected to state senate, 1779, but did not take his seat. He printed and circulated at his own expense an edition of Butler's "Analogy" and Jenyns's "View of Christianity."

Hen'selt, Adolph von, 1814–89; German pianist; b. Schwabach, Bavaria; 1838, went to St. Petersburg, where he lived for the rest of his life, and where he gained a great reputation, and was appointed instructor to the imperial children. He composed much for the piano, and his works have remained very popular.

Hen'ty, George Alfred, 1832–1902; English author; b. Trumpington, Cambridgeshire; became a special correspondent of the London *Standard*, and served through a number of military campaigns, in which he gathered information and other material with which he wrote nearly 100 books, chiefly for boys, with whom he was an especial favorite.

Henzada (hēn-zä'dä), district and city of the Irawadi division of Lower Burma, India; on the Irawadi River above Rangoon, and E. of Arakan; area, 1,948 sq. m.; pop. 320,000; is a level plain, subject to inundations, from which it is protected by immense embankments, and is everywhere suitable for the cultivation of rice. The district was once a part of the Talaing kingdom of Pegu, but was annexed to Burma, 1753. The chief town is Henzada, on the right bank of the Irawadi. Pop. (1900) 15,000.

Hepat'ica, genus of plants of the order *Ranunculaceæ*, so closely allied to *anemone* that some botanists place it as a section of that genus. The common name is liver leaf, and it is sometimes incorrectly called liverwort. The botanical name and its popular one both have reference to a fancied resemblance in shape be-

HEPATICA.

tween the leaves of the plant and the liver. The commonest species, *H. triloba*, is widely distributed in the cooler portions of both hemispheres. The single-flowered *H. triloba*, with several double varieties, with flowers of various shades of red, blue, purple, and crimson, as well as white-flowered ones, are in cultivation in Europe. In the U. S. they do not succeed, exposed to the heats of our long summers, unless in a moist rich soil.

Hep'burn, James. See BOTHWELL, JAMES HEPBURN (Earl of).

Hephæstion (hē-fēs'tē-ŏn), abt. 357–324; friend of Alexander the Great; b. Pella. At what time he and the prince became companions is not known; they are first mentioned together on the occasion of Alexander's visit to Troy, where Hephæstion brought the same honors to the grave of Patroclus as Alexander to that of Achilles; but after that time they never separated until the death of Hephæstion in Ecbatana, one year before that of Alexander. Alexander never preferred Hephæstion to a better man, and Hephæstion never disappointed the confidence Alexander placed in him. When Hephæstion died, Alexander sent messengers to inquire of Jupiter Ammon how he should honor Hephæstion, and was instructed to sacrifice to him as a hero. Alexander then celebrated the funeral, which was one of the most magnificent in history. A portion of the walls of Babylon was razed in order to make room for the pyre,

which cost 12,000 talents, while the animals offered in sacrifice to the new hero numbered 10,000, and the entire army were guests of the king on the occasion. Temples were erected in honor of Hephæstion in various parts of the empire.

Hephæs'tus, in Greek mythology, the god of fire and lightning and the smith of the gods, identified by the Romans with Vulcan (*q.v.*). Homer found his myth already fully elaborated. It illustrates the origin of the gods from natural phenomena, for Hephæstus and fire (his element) continued to be syonymous terms even in post-classical times. His home and smithy were on Olympus. His frame was huge, the upper part of his body being well developed, strong, and powerful, though he was lame from his birth, and his weak and puny legs barely allowed him to hobble along. The ancients themselves explained his body as being typical of the twofold nature of fire—its might and its uncertain flickering character. He has to walk with a staff, and he is supported by little golden maidens endowed with intellect, his own handiwork, and even then his gait is halting. Externally he is a common smith, but his cunning works prove his divinity, for they are such as no mortal could execute.

By command of Zeus, Hephæstus made Pandora (*q.v.*) by mixing earth and water. He thus became the creator of the human race, though to Prometheus the honor of man's creation is usually ascribed. Though reckoned as one of the twelve great gods, he was singularly helpless except in his own realm of fire, where he was supreme. He was of a kindly disposition, as witness his gentleness toward Hera and his sympathy for Prometheus. As the halting cup bearer of the gods he caused infinite merriment in Olympus. In later times his forge is transferred from Olympus to the center of volcanoes, where his activity may still be noted.

Heptan'omis ("the seven provinces"), the central division of Egypt lying between the Delta and the Thebaïs, and including the territory between Memphis and Hermopolis Magna. The threefold division belongs to the Greco-Roman period, and the name is first used by Ptolemy in the first part of the second century. In the middle of the fifth century it is replaced by the name Arcadia. During the French occupation the threefold division of the land was revived.

Heptarchy (hĕp'tärk-ĭ), a government by seven, especially applied in a somewhat misleading way to the seven principalities of the Anglo-Saxons in England before the reign of Egbert, the first King of England, who became King of Wessex, 800, and died, 836. Eight kings, of six different kingdoms (all except Essex and Mercia), had at times possessed a certain supremacy over the rest. The actual number of kingdoms was sometimes greater and sometimes less than seven, and yet seven stand out so prominently that they have led to the use of the term heptarchy. The seven kingdoms were: 1, Kent (449–823); 2, Sussex, 477–823); 3, Wessex, (519–823); 4, Essex (526–823); 5, Northumbria (547–827); 6, East Anglia (571–823); 7, Mercia (584–827). In 828, Egbert of Wessex, the eighth bretwalda, became the first hereditary King of England; but some of the minor kingdoms existed for many years thereafter.

Hep'worth, George Hughes, 1833–1902; American minister and author; b. Boston, Mass.; pastor of Unitarian Church at Nantucket, 1855–57; of the Church of the Unity, Boston, 1858–70; became, 1862, a regimental chaplain in Louisiana, and served, 1863, on the staff of Gen. N. P. Banks; was (1870–72) pastor of the Church of the Messiah, New York; 1872, became a Trinitarian, and soon organized the Church of the Disciples, of which he was pastor till 1879; pastor of Belleville Avenue Congregational Church, Newark, N. J., 1882–85; became an editor of the New York *Herald*, 1885. His works include "Whip, Hoe, and Sword"; "Rocks and Shoals," "Starboard and Port."

He'ra. See JUNO.

Heraclea (hĕr-ä-klē'ä), Greek city of Lucania, in S. Italy; near a place now called Policoro, and not far from the Tarentine Gulf; was founded 432 B.C., and attained great wealth and power, and became a kind of capital for the Italiote Greeks. In the first century B.C. it was a Roman *municipium* of some importance. In 1732, not far from its site, were found the bronze tablets containing the "*Lex Julia municipalis*" of Cæsar (45 B.C.), a monument of great importance for the student of Roman history and Roman law.

Heracleidæ (hĕr-ä-klī'dē). See HERCULES.

Heracleop'olis (Egyptian, CHENENSUTEN or CHENENSU; present, AHNAS), name given by the Greeks to the capital of the twentieth nome of upper Egypt. Its site is now 12 m. W. and inland from Benisuef, and is marked by a few pillars and a large mass of rubbish. It was a very ancient city, and in the twelfth dynasty was an important center of literature and art. In mythology it was also important, since it is mentioned in the legend concerning the destruction of mankind for revolt against the sun god Ra, and it also contained the hill upon which Ra first appeared, bringing light and order into the world.

Heraclitus (hĕr-ä-klī'tŭs), Greek philosopher of the sixth century B.C.; b. Ephesus, and from his gloomy disposition was styled the "weeping philosopher." His philosophical creed was embodied in a work entitled "On Nature." The most remarkable tenets of this creed were that, by the operation of a light ethereal fluid constantly active, self-changing, and all transforming, which he denominated fire, all things in the universe, animate and inanimate, material and immaterial, were created and shaped, and that acquiescence in the decrees of the supreme law was the great duty of man. From his obscure style the Greeks surnamed him "the unintelligible." He was regarded in antiquity as the antipodes of Democritus, the "laughing philosopher."

Heracli'us, abt. 575–641; Roman Emperor of the East; b. Cappadocia; son of Heraclius, exarch of Africa, who sent him, 610, with a fleet to besiege Constantinople and dethrone the tyrant Phocas. This he accomplished, and was himself chosen to fill the vacant throne. After protecting his European dominions against the Northern barbarians, he made successful expeditions against the Persians, 622 and 623, defeating Chosroes II in person. In 625 he gained a third great victory over the Persians on the river Sarus in Cilicia, and, 627, defeated them again in a great battle near Nineveh. Heraclius made a treaty of amity with Mohammed, but a war with the Arabs soon broke out, in which he lost Syria, Palestine, and Egypt.

Her'ald, messenger charged with an important mission, as a declaration of war or international treaty; in the Middle Ages an official who marshaled the combatants in the lists, and served as a messenger between princes. The heralds were charged also with questions of genealogy and heraldic bearings.

Her'aldry, art or science of blazoning or describing in appropriate technical terms coats of arms, badges, and other heraldic and armorial insignia. Heraldry cannot be traced as a system to a time earlier than the close of the twelfth century. It was gradually elaborated during the Crusades, and was probably systematized to some extent by the Germans; but to the French is due the credit of perfecting it and of inventing its technical nomenclature. By the end of the thirteenth century heraldry had become bound by strict rules and terms. From the display of arms on garments is derived the phrase "coat of arms." *Blazoning* is the art of so describing arms that a drawing can be made from the description. It requires a very exact use of the complicated terminology of the herald. The rules of heraldry differ somewhat in different countries, but the general principles are the same. In English heraldry, to which this article will be confined, arms are divisible into three classes: arms of states, of communities or corporations, and of persons and families. All these classes of arms are displayed on a shield or escutcheon.

The face of the shield, on which the arms are blazoned, is technically called the field. To facilitate description, heralds divide this into nine parts, *viz.*: 1, the dexter chief; 2, middle chief; 3, sinister chief; 4, honor point; 5, fess point; 6, nombril or navel point; 7, dexter base; 8, middle base; and 9, sinister base. Fields are diversified by tinctures, lines of division, and charges. Tinctures are composed of metals, colors, and furs. Metals are or (gold) and argent (silver). Colors are gules (red), azure (blue), sable (black), vert (green), and purpure (purple). The furs are ermine, vair, and potent, which have some variations. In drawings and engravings the tinctures are designated by dots and lines. Thus or is known by the shield being filled with dots, argent by a plain shield, gules by vertical lines, azure by horizontal lines, etc. (See Fig. 2.) The field being often of a combination of colors, it is variously divided by lines. When the division is into two equal parts by a vertical line, it is said to be parted or party per pale; by a horizontal line, per fess; by a dexter diagonal line, per bend; by a sinister diagonal line, per bend sinister. All of these divisions are multiplied by the use of a variety of lines, the principal of which are called engrailed, invected, wavy, embattled, nebuly, raguly, indented, dancette, and dovetailed.

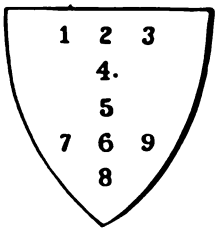


Fig. 1. Points of Escutcheon.

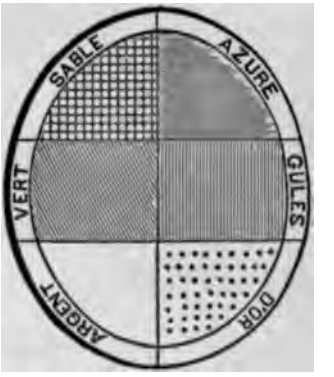


Fig. 2.

A charge is any emblem or figure borne in the field, and the field thus blazoned is said to be charged. Common charges include beasts, birds, fishes, shells, reptiles, insects, the human figure, imaginary beings, celestial bodies, trees, plants, and flowers, and miscellaneous inanimate objects. Of imaginary beings, the griffin, dragon, unicorn, cockatrice, wyvern, triton, and mermaid are common. The attitudes of the animals represented have their definite names, and a lion, for instance, may be rampant, passant, couchant, dormant, etc., according as he is represented—as standing on his hind legs, as walking on all fours, lying down, asleep, etc. Every detail is covered. If a lion head, for instance, looks in the direction he is represented as going, *i.e.*, to the left, he is simply a lion rampant, dormant, etc., but if the head is turned to the spectator he becomes a lion gardant, and a further turn of the head toward the tail makes him a lion regardant. The celestial bodies, trees, plants, and flowers of many kinds, and many miscellaneous objects, such as helmets, swords, arrows, horseshoes, and buckles, are also used as charges. When represented of its natural color, a charge is called proper. It is considered false heraldry to put metal on metal or color on color. A series of nine emblems called differences or marks of cadency are used to distinguish the several sons in a family and the subordinate branches of each house.

Marshaling of arms is the orderly arrangement of a number of coats of arms within one

shield, by impaling or quartering. Where several coats of arms have been acquired by intermarriages of ancestors with heiresses, they are quartered in one shield. Besides the devices borne on the shield, a coat of arms often has exterior ornaments, *viz.*: the crown or coronet, helmet, mantlings, wreath, crest, scroll and motto, and supporters. The crown or coronet is borne above the shield by those privileged to bear it. Helmets are of four kinds, those of kings and princes of the blood royal, of nobles, of knights and baronets, and of esquires and gentlemen. The mantling, or lambrequin, is a kind of scrollwork, flowing from the helmet. The wreath is formed of the two principal colors of the arms, and surrounds the top of the helmet like a fillet. Out of it rises the crest, the uppermost device of a coat of arms. No crest is allowed to a female. The scroll and motto are placed beneath the shield. Supporters are figures standing on the scroll on each side of the shield which they seem to support.

Herald's Col'lege, or College-of-Arms, corporation instituted 1464 by Edward IV, chartered 1483 by Richard III, confirmed by Edward VI, 1549, and rechartered by Philip and Mary, 1554. Its office is in Queen Victoria Street, London. Its president is the Duke of Norfolk, hereditary earl marshal of England. The three English kings-of-arms, Garter, Clarencieux, and Norroy; the heralds, Chester, Windsor, Lancaster, York, Somerset, and Richmond, and the pursuivants, Portcullis, Bluemantle, Rouge Croix, and Rouge Dragon, are members of the corporation whose business it is to decide what heraldic bearings are properly borne, to grant new ones, etc. The Lyon Office in Scotland and the Office-of-Arms in Ireland perform similar functions.

Herat (hĕr-ăt'), city in W. Afghanistan; on the Heri-rud; is fortified and situated in a fertile and highly cultivated country; has large bazaars, and, besides its own manufactures of carpets, woolens, and leather, has a considerable trade with China, India, and Persia. On account of its position it may become the point of contention between Great Britain and Russia in their Asiatic rivalries. Pop. abt. 45,000.

Herba'rium, collection of dried and pressed plants; formerly called a *hortus siccus*, fastened to sheets of heavy paper and labeled. Such collections are now to be found in connection with nearly all the larger colleges and universities in the U. S. In the National Museum in Washington is the National herbarium; other important ones are the Gray at Harvard, Torrey and Meisner at Columbia, and that of the Academy of Natural Sciences in Philadelphia. In Europe among the greatest collections are those at Kew (Kew Gardens), London (British Museum), Paris (Jardin des Plantes), Geneva (de Candolle), and Berlin (University).

Her'bart, Johann Friedrich, 1776–1841; German philosopher; b. Oldenburg; became a tutor at Berne, 1797; Docent of Philosophy and Pedagogics at Göttingen, 1802; Prof. Extraordinarius, 1805; Prof. Ordinarius at Königsberg, 1809; founded a pedagogical seminary; took the Chair of Philosophy at Göttingen, 1833, and held it until his death. His works include "General Practical Philosophy," "The Chief Points of Metaphysics," "Introduction to Philosophy," "Psychology as a Science Newly Based on Experience, Metaphysics, and Mathematics." His system, which in opposition to contemporary idealism he called realism, became very influential in Germany on the fall of Hegelianism.

Her'bert, George, 1593–1631; religious poet; brother of Lord Herbert of Cherbury; b. at Montgomery Castle; was educated at Trinity, Cambridge, where he received a fellowship in 1615, and proceeded M.A. in 1616; was university orator, 1619–27, and seemed destined for civil promotion, which was promised by the king and courtiers; took holy orders in 1625, and in 1630, rector of Bemerton, where he died. Herbert was a man of profound learning and sincere piety. His poetry includes some of the finest sacred lyrics in our language. The most popular of his prose writings has been his "Character of a Country Parson" (1647).

Herbert, Henry William, 1807–58; American author; b. London; son of William Herbert, Dean of Manchester; settled in New York, 1831, and after 1834 published several historical novels, historical works, versions of French romances, and translations. His most celebrated works were on sporting, published under the pen name of "Frank Forester," including "The Field Sports of the United States and British Provinces," "The Fish and Fishing of the United States," "The Horse and Horsemen of the United States and British Provinces of North America," and "American Game."

Hercula'neum (the "town of Hercules"), city of Campania, on the slope of Vesuvius, between Naples and Pompeii, to which Retina served as a port. This site was first occupied by the Osci, afterwards by Greek colonists, who named it *Herakleion*, and both in architecture and in institutions it had the character of a Greek city. Herculaneum was conquered by the Romans after the so-called War of the Allies, and in the time of the empire was much frequented as a pleasant resort. The Fabi and the Balbi had residences in Herculaneum; Agrippina also had a villa there. The earthquake of A.D. 63 did great damage to Pompeii, but comparatively little to Herculaneum, which appears to have been more solidly constructed. The houses of Pompeii were small, while Herculaneum had its palaces and temples. The great eruption of Vesuvius which buried Pompeii, A.D. 79, also overwhelmed Herculaneum; not, however, with burning lava, as many have supposed, but with volcanic ashes, afterwards converted into a soft tufa by water. On the soil deposited above the city have arisen Portici and Resina. Herculaneum was buried deeper and deeper by later eruptions of Vesuvius, until it had almost passed out of memory. Excavations at various times, system-

atically begun in 1738, have laid bare much of the city, and brought to light statues, bronzes, and other works of art, and papyrus rolls found in a large library. Some of the most perfect examples of the Roman house have been disclosed.

Hercules (hėr'kū-lēz), most renowned of the mythical heroes of antiquity, son of Jupiter by Alcmene, the granddaughter of Perseus. His name originally was Alcides or Alcæus; it was changed to Hercules by the Delphic oracle, which ordered him to live at Tiryns and serve Eurystheus twelve years. Jupiter made Juno promise that Hercules should become immortal on the completion of twelve great works for Eurystheus, the most common enumeration of which is the following: 1, the fight with the Nemean lion; 2, the fight with the Lernæan hydra; 3, the capture of the Arcadian stag; 4, the hunt of the Erymanthian boar; 5, the cleansing of the Augean stables; 6, the destruction of the Stymphalian birds; 7, the capture of the Cretan bull; 8, the abduction of the

HERCULES DESTROYING THE HYDRA.

mares of Diomedes; 9, the seizure of the girdle of Hippolyte, queen of the Amazons; 10, the capture of the oxen of Geryones; 11, the getting of the golden apples of the Hesperides; 12, the seizure of Cerberus, the dog that guarded the entrance to Hades.

His death was tragical. Believing that it was a philter, Deianira, his wife, tinged his garment with a poison she had received from Nessus. When Hercules put on the garment the poison attacked his body, and, tearing the flesh from his bones, he fled from place to place in frightful agony. At last he could bear it no more. He heaped up a huge pile of wood, and, setting fire to it, placed himself on its top; when the flames began to lick his tortured body a cloud came down from the sky and carried him up to heaven. His descendants, especially those who joined the Dorians in their conquest of the Peloponnesus, are known as the Heracleidæ. In the original legends, Hercules figures as a mighty chieftain, who dethrones princes and gives away kingdoms and scepters. The worship of Hercules prevailed especially among the Dorians; he was also worshiped at Rome, and, under various names, in many parts of the ancient world. In works of art he is most frequently represented clothed in a lion's skin and carrying a club.

Hercules, Pil'lars of, name given by the ancients to Calpe (Gibraltar) and Abyla (now Ceuta), two rocky promontories, one on each side of the Strait of Gibraltar. It was fabled that Hercules found them one mountain, but tore them asunder, thus making a connection between the ocean and the Mediterranean Sea. In heraldry they figure as the supporters of the Spanish national arms. They are seen with the motto *Ne plus ultra* (No more beyond), indicating that the pillars are at the end of the world, as anciently believed. These are the well-known pillars on Spanish coins, and the sign $, standing for "dollar," is thought by some to represent these pillars with the fillet for the motto across them.

Hercynian (hėr-sīn'ĭ-ēn) **Forest,** name employed by Greek and Roman writers to denote the great central and S. forest region of ancient Germany. The term in its widest sense seems to have included the Bohemian Forest, the Harz (a name apparently connected with the ancient designation), the Black Forest, and others.

Her'der, Johann Gottfried von, 1744–1803; German author; b. Mohrungen, E. Prussia; became a preacher at Riga, 1765, where the fervor and power of his discourses quickly made him an object of general enthusiasm; in 1769, resigned his pastorate to travel. While residing at Strassburg he was intimately associated with Goethe, and, 1776, through his influence, was appointed court preacher and member of the Consistory at Weimar, where he passed the rest of his life. He brought the instincts of piety and of poetic fancy, illustrated by a wide erudition rather than the dialectics of the schools, to bear on the questions of religion. This tendency appears in his "Spirit of Hebrew Poetry." He translated many legends and songs from Oriental and modern languages. His most important work is the unfinished "Ideas on the Philosophy of the History of Mankind," 1784–91. Herder was the first to set forth the idea of history as the development of a national genius, as the growth of a vital power, as an evolution—an idea which reached its most brilliant perfection in the philosophy of Hegel.

Heredia (ā-rā-dē'ä), **José Maria de,** 1842–1905; French poet; b. Santiago de Cuba, Cuba; settled in Paris, and contributed prose and verse to the leading reviews and magazines; published, 1893, a book of poems, chiefly sonnets, "The Trophies," which went through ten editions in a month. He was elected a member of the French Academy, 1894; translated into French Diaz del Castillo's "History of the Conquest of New Spain," and the "Life of the Nun Alferez."

Heredia, Pedro de, 1500–54; Spanish soldier; b. Madrid; was of noble family; became governor of Santa Marta, and made expeditions in the interior of what is now Colombia; returned to Spain, 1529; obtained the privilege of colonizing and governing Nueva Andalusia, between the Magdalena and the Gulf of Urabá, or Darien; founded, 1533, the city of Carta-

gena as the capital of his new domain; owing to quarrels with the authorities of Panama and to various irregularities, was imprisoned and sent to Spain, 1537, but was restored, 1539; was forced to return to Spain to answer charges, 1548, 1554, and on the last voyage was shipwrecked and drowned.

Heredia y Campuzano (-ē kăm-pō-zä'nō), **José María,** 1803–39; Spanish-American poet; b. Santiago de Cuba; became a lawyer; took part in the attempted revolution of 1823, was banished, and lived in the U. S. for two years; went to Mexico, 1825, was naturalized, held various civil and judicial positions; was also connected with several journals; published at New York, 1824, a volume of poems, which included his magnificent "Ode to Niagara."

Hered'ity, term applied to that law of living things whereby the offspring resembles the parent, the characteristics of one generation being repeated in the next. When the word is used, one is apt to recall only those striking instances of inheritance of genius (*e.g.*, of musical ability in the Bach family), or of physical peculiarities (like the repetition of the "Bourbon nose" in successive generations of the former royal family of France). But the scientific mind is not satisfied with the statement that this repetition is "natural"; it seeks for explanations and for a knowledge of the methods by which it is brought about, and as a result several theories of heredity have been formulated. A satisfactory theory of heredity must fulfill, among others, the following conditions: (1) It must be in full accord with the facts learned by embryology. (2) It must allow not only for the reappearance of general form and structure, but of individual peculiarities as well. (3) It must allow for individual congenital variation. (4) It must permit of the inheritance of at least certain variations and modifications. (5) It must explain the reappearance of peculiarities after they have been dropped for several generations (atavism). (6) It must admit of the participation of both parents in the formation of the germ (fertilization), and permit, in certain instances, unfertilized eggs to develop (parthenogenesis). (7) It must, in the cases of fertilization, allow both parents to perpetuate their peculiarities in varying degrees.

Soon after the publication of Darwin's "Origin of Species" several theories were advanced to account for heredity, among which may be mentioned Spencer's "Physiological Units," Darwin's "Theory of Pangenesis," the "plastidule" theories of Elsberg and Häckel, and Jäger's "flavor-and-odor-substance" theory. As these all resemble one another in certain features, and are all based on the assumption of infinitesimally minute particles, it will be sufficient to give a brief outline of Darwin's theory. In his "Provisional Theory of Pangenesis" (1868) Darwin for the first time takes into consideration all the limitations outlined above, as well as the other view, then accepted without question, that the effects of use and disuse, etc. (Weismann's "acquired characters"), may be transmitted to subsequent generations. He assumes that minute particles—"gemmules"—are constantly thrown off from every cell of the body, not only in the adult but in every stage of growth; and that these gemmules retain the impressions not only of the cells from which they come, but of the various conditions to which they have been exposed. These gemmules circulate freely through the system, and by their union are formed the sexual elements. "Hence, speaking strictly, it is not the reproductive elements nor the buds which generate new organisms, but the cells themselves throughout the body."

In 1883 Prof. August Weismann offered a new theory of heredity, briefly as follows: Inheritance in the many-celled animals (Metazoa) and multicellular plants takes place through the germ cells—the egg and spermatozoön in animals, the corresponding cells, known under various names, in plants. Since the offspring may inherit from either parent, the means for transference of ancestral traits must be the same in both the male and the female sexual products. Analysis of these products shows that, apparently, there is but a single substance present in them which fulfills all conditions, and which can serve as the physical basis of heredity. This is that peculiar substance known as chromatin, or chromoplasm. Chromatin forms an essential part of the nucleus, not only of the sexual cells, but of all cells of both animals and plants. In all cases of the division of cells (mitosis) the chromatin is divided between the daughter nuclei by a peculiar process, which is apparently adapted to secure an equal division, so that each half shall exactly resemble the other. The impregnation of the egg, on the other hand, is the reverse of this. There is a union of the chromatin of the male and female cells to form nuclear material for the germ which is about to develop. Hence it follows that when development begins, each cell of the body shares equally in the chromatin of the germ cells of both parents, because all of those cells are derivations by equal division of the compound or impregnated cell.

In the whole process of development there is a constant division of nuclear material, and at no time, except in impregnation, is there a union of chromatin from two cells. The diminution of chromatin, which is the consequence of division, is made good only by the assimilation of nonchromatin material. It therefore follows that the chromatin of the germ cells (the germ plasm of Weismann) is not and cannot be derived from any part of the body, but is rather a direct descendant of the germ plasm of the parent germ cells. These cells are therefore set apart from all other cells of the body for the perpetuation of the species. They can transmit nothing to the next generation except what they have received from their parents, or what may originate in themselves. See ATAVISM; DARWINISM; EVOLUTION.

Hereford, city of England; county town of Herefordshire, on the Wye; 144 m. WNW. of London; has a noble cathedral begun, 1079, and finished, 1248, a hospital, grammar school, free library, corn exchange, some manufactures of gloves and flannels, considerable trade in

agricultural produce, and a large cattle fair. Pop. (1901) 21,382.

Herero (hĕ-rā'rō). See DAMARALAND.

Her'esy, choice, preference, chosen way of life, of belief, of doctrine, or teaching; a sect, school, party in philosophy, medicine, literature, or religion; the doctrine of such a party; hence discord, separation, faction as the result of such views. In the New Testament *hairesis* means sect and faction. The *hairetikos* (Tit. iii, 10) is a fomenter of divisions, whether by false doctrines or factious practices. In this now universally prevalent sense, heresy is a doctrine in conflict with what is believed to be important truth. In the Church it is a doctrine perversely held by nominal Christians in conflict with one of the Articles of Faith. According to Blackstone: "Heresy consists not in a total denial of Christianity, but of some of its essential doctrines, publicly and obstinately avowed."

Heresy may be the opinion of individuals unorganized, or it may be the doctrinal basis of *heretical sects.* Such were the Gnostics and Manicheans. That is heresy by the general judgment of the great body of the Christian world which is in conflict with the three general creeds.

Heresy is allied to heterodoxy, but is a narrower and harsher term. Infidelity rejects and skepticism doubts revealed truth. Schism or sectarianism rends the Church on questions which really belong to her liberty. Heresy corrupts what it professes to accept. Schismatists separate from the Church, and heretics are cast out of it. Simple error may be no more than a mistake of the intellect; heresy involves a voluntary and persistent perversion of the truth; blasphemy is reproachful language against God or divine things.

The infirmities of the human mind and character, the vast and profound problems involved in religion, the obscurities of the language interpreted and of the language interpreting, the extravagant development of isolated parts of a truth, the tardiness of pace on the part of some who remain behind in a position once general, but afterwards abandoned (such was montanism), the influences of education, of special mental types, of speculative and practical systems, the passions of men, the love of novelty, and the overbearing of a blind conservatism, and many of the best principles of our nature, mistaken, distorted, or perverted, are among the causes of heresies. Many heresies are mere blunders of phraseology, and the wars in them have been wars of words.

The first instance of the infliction of death on heretics was the beheading of Priscillian and two of his adherents, 385. From the twelfth and thirteenth centuries the persecution of heretics led to bloody wars, and the Inquisition was established. In Rome until 1769 there was a yearly public reading of the bull *In Cœna Domini* which enumerated and anathematized all heresies. Calvin, 1554, advocated the killing of heretics, and in England under the statute *De Haretics Comburendo,* 1401, many of Wycliffe's followers were burned. The law under which heretics were burned to death was abolished under Charles II, 1676. The last person put to death in Great Britain for heresy was Thomas Aikenhead, a young student of divinity, executed in Edinburgh, 1696, under a statute against blasphemy. The statute was repealed under George III. In the Protestant world the most interesting trials for heresy have been in the Presbyterian Church, and have turned upon the question whether a professor of theology could hold the so-called critical views as to the Bible and still retain his ministerial standing and his professorship. In the Free Church of Scotland Prof. William Robertson Smith was tried by the Assembly of 1880 and acquitted by a majority of seven in a court of nearly 600 members, but was removed from his chair by the assembly of 1881; in the Presbyterian Church in the U. S. Prof. Charles Augustus Briggs was tried by the Assembly of 1893 and condemned by a vote of 379 to 116, whereupon he was suspended from the ministry.

Hereward (hĕr'ĕ-wärd), d. abt. 1072; English outlaw and patriot; b. Lincolnshire; joined the invading Danes, 1070; sacked the abbey of Peterborough; was driven to the Isle of Ely, which he defended against William the Conqueror, but from which he was compelled to retreat. His exploits are set forth in Kingsley's novel, "Hereward the Wake."

Hergenröther (hĕr'gĕn-rö-tĕr), **Joseph,** 1822–90; German prelate; b. Würzburg, Bavaria; became, 1852, Prof. of Canon Law and Church History in the Univ. of Würzburg; was one of the German divines invited by Pius IX to take part in the labors preparatory to the Vatican Council; was made a cardinal, 1879; published "Antijanus," a defense of papal infallibility; "Catholic Church and Christian State"; "Church History"; author of the ninth volume of the second edition of Hefele's "History of the Councils."

Her-Hor, or Hir-Hor (hĕr'hâr), the *Smendes* of Manetho; the first king in the twenty-first dynasty of Egyptian history, and founder of the priestly line of sovereigns, abt. 1100 B.C. Under Rameses XIII, the last king of the twentieth dynasty, he was chief priest of Amon, and even during the lifetime of that king he succeeded in concentrating in himself a power superior to that of the monarch. On his accession to the throne he assumed the usual royal title, "King of both lands," Upper and Lower Egypt, and boasted of his prowess in repulsing his enemies and of receiving foreign tribute. His main service was his hiding the remains of his predecessors so securely that they were not found till 1881, when the mummies of Aahmes I, Amenophis I, Thothmes I, II, III, Rameses I, II, and Seti I, and other rulers and princes, were recovered by Emil Brugsch Bey from a subterranean chamber in the mountain W. of Thebes.

Hering (hā'rĭng), **Ewald,** 1834– ; German physiologist; b. Neugersdorf, Saxony; practiced medicine in Leipzig, 1860–65; tutor in medicine, Univ. of Leipzig, 1862–65; professor in Vienna, 1865–70; Prof. of Physiology, Univ.

of Prague after 1890; author of numerous works on psychophysics, the theory of color, etc. The dominant theory of color vision goes by his name, since in its original form it was proposed by him and rests principally upon his experiments.

Her'iot, George, 1563–1624; Scottish philanthropist; b. Edinburgh; accumulated a large fortune as a goldsmith in London; founded the Heriot Hospital or school in Edinburgh, for the free education of the sons of poor, deceased, or decayed burgesses. Other schools were added to the hospital, 1837, for poor children, but were closed, 1885, the hospital having been reconstituted as a science and technical school. The Heriot-Watt College, providing the same kind of instruction for older students, at moderate fees, was also subsidized from the Heriot trust, the annual revenue of which yields over £30,000.

Heriot, in English feudal law, the repayment on the death of a thane, out of his chattels, of the gift of arms and equipment given to him upon the grant to him of bookland by his lord.

Her'kimer, Nicholas, abt. 1720–77; American military officer; became a militia lieutenant, 1758, and commanded at Fort Herkimer on the Mohawk (now in German Flats, N. Y.) in that year, at the time of the French and Indian attack; appointed brigadier general by the State Convention, 1776; marched against Sir John Johnson's Tories and Indians, 1776; led an expedition to the relief of Fort Stanwix (now Rome, N. Y.), then besieged by St. Leger; was ambuscaded by the Indians and defeated at Oriskany, August 5, 1777; died from the effects of an amputation.

Her'komer, Sir Hubert von, 1849– ; English painter; b. Waal, Bavaria; was taken to the U. S. by his father, a wood carver, 1851, but returned to Europe, 1857, and entered the art school at Southampton, England; Royal Academician, 1879. He took the medal of honor, Paris Exposition, 1878; first-class medal, Paris Exposition, 1889; became Slade Prof. of Art, Oxford Univ., and life professor at Munich; Associate of the French Academy of Fine Arts, 1895; established an art school at Bushey, Hertfordshire, England; was knighted, 1907. His best work is "The Last Muster—Chelsea Hospital."

Hermandâd (ĕr-măn-dăth'), "brotherhood," general name for the leagues entered into by the Spanish cities in the Middle Ages for the preservation of public order and the defense of private property. The most celebrated (called Santa Hermandâd, or Holy Brotherhood) was organized in Aragon about the middle of the thirteenth century, was established in Castile, 1282, and, 1496, was extended over a great part of Spain. Ferdinand and Isabella reduced the Holy Brotherhood from its high office of conservator of the peace and defender of popular rights against the feudal nobility, and it became an organized police force or militia.

Her'mann, 18 B.C.–19 A.D.; German chieftain of the Cherusci; son of Sigimer; entered the Roman service, and became an equestrian; in 9 A.D.; ambuscaded the Romans in the Teutoburger Forest, and almost all the Romans, Varus included, lost their lives. He fought Germanicus, 14–16 A.D., with disadvantage; defeated Marbodacus, King of the Suevi, 17; and was probably put to death by his own kinsmen, on the ground that he was aiming at absolute power, but his name continued to live on among the German tribes as a symbol of independence.

Hermann, Friedrich Benedict Wilhelm von, 1795–1868; German political economist; b. Dinkelsbühl, Bavaria; after teaching mathematics at the gymnasium and polytechnic school in Nuremburg, became, 1833, Prof. of Political Science at Munich; held a position of high rank in the state service of Bavaria, and, 1848, sat as member for Munich in the Frankfort Assembly, where he was one of the organizers of the "Great German" party; chief work "Economic Researches."

Hermann, Johann Gottfried Jakob, 1772–1848; German Greek scholar; b. Leipzig; privat docent at Leipzig, 1794; Prof. Extraordinary of Philosophy, 1798; full Prof. of Eloquence, 1803; of Poetry, 1809; published "Elements of Metrical Doctrine," "On the Meters of Pindar," "Opuscula," etc.

Hermann, Karl Friedrich, 1804–55; German classical scholar; b. Frankfort on the Main; privat docent in Heidelberg, 1826; Ordinary Prof. at Marburg, 1832; librarian, 1833; called to Göttingen, 1842; author of a standard work on Greek Antiquities; a complete edition of Plato, etc.

Hermaph'rodism, or **Hermaph'roditism,** union of the characteristic organs of each sex in one individual. This union of the male organs producing sperm cells) and female (producing germ cells) in one and the same organism is the normal condition in the great majority of plants and in many of the lower animals. Though the higher forms of radiates, mollusks, and Arthropoda all have the sexes quite distinct, except in abnormal instances, many of the inferior types of each are always hermaphrodites. Such, for instance, are the common snail and the earthworm. No insect hermaphrodites are known, except in abnormal instances. Hermaphrodism has not been observed with certainty in vertebrates, except perhaps in eels and a few fishes. Many of the lowest forms of hermaphrodite plants and animals are self-fertilizing—that is, reproduction takes place without the sexual union of two individuals; but in very many plants which have both kinds of reproductive organs in one flower, fertilization is accomplished by means of insects, which carry the pollen of one flower to the pistil of another, nature having prevented self-fertilization by wonderfully ingenious yet often very simple means. Spurious hermaphroditism, in which the characteristic organs of one sex assume, from incomplete or abnormal development, something of the appearance of those of the opposite sex, has been often observed. Under this head must be placed all of the recorded instances of hermaphrodism in the human species.

Hermaphroditus (hêr-măf-rō-dī'tŭs), in Greek mythology, a son of Hermes and Aphrodite, who inherited the beauty of both of his parents. Once, when he was bathing in the fountain of Salmacis, near Halicarnassus, the nymph of the fountain prayed to the gods that she might remain united with him forever; and when he ascended from the bath he was changed so that he was neither man nor woman, but both. The idea of this myth is of Asiatic origin. In the Hellenistic period Greek sculpture often represented Hermaphroditus, the upper part of the body female, the nether male.

Her'mas, author of a religious romance, "The Shepherd" (in Latin "*Pastor*"), which was for two hundred years widely read among Christians, quoted as Scripture by Irenæus, by Clement of Alexandria accepted as inspired, and by Eusebius stated to have been publicly read in the churches. According to one opinion he was the brother of Pius, Bishop of Rome, 142–157. Rome probably was the place of composition. The book contains an allegory, which was the "Pilgrim's Progress" of the early Church.

Hermeneutics (hêr-mē-nū'tĭks), science and art of interpretation, or of ascertaining the meaning of an author from his language, this Greek word meaning pertaining to interpreting or to an interpreter; is closely allied to grammar, logic, and rhetoric, and presupposes them. Biblical hermeneutics is general hermeneutics applied to the sacred Scriptures, and may be traced to the Jews and to Philo of Alexandria, who reduced the allegorical method of interpretation to a system, which through Origen passed into the Christian Church. It concerns itself with the body or letter of the text, with verbal, critical, and antiquarian researches; with the divine thoughts and spiritual truths of the Bible, and explains them in connection with its general teaching and according to the analogy of faith; applies the text to the wants of the human heart. These three forms of interpretation must harmonize with each other, and together give the one full meaning of the text.

Hermes (hêr'mēz), in Greek mythology, son of Zeus and Maia, a daughter of Atlas; invented the lyre and gave it to Apollo in return for the golden caduceus and prophetic honors; was the messenger and herald of the gods; the patron of gymnastics; the inventor of oratory; the promoter of fertility in plants and animals; the patron of herdsmen, and of travelers and rogues; the go-between in the intrigues of the gods; the guider of the souls of the dead to Hades; the god of chance; is represented in art with the caduceus (herald's staff), the petasus (winged hat) and winged feet, both indicative of his swiftness. He was worshiped all over Greece. Hermes became identified with the Roman Mercury.

Hermes (hêr'mĕs), Georg, 1775–1831; German theologian; b. Dreierwald, Westphalia; Prof. of Theology at Münster, 1807, and at Bonn, 1819; strove to form a common basis for Protestantism and Roman Catholicism; published "Introduction to the Catholic Christian Theology" and "Christian Catholic Dogma"; founded a school or doctrine termed Hermianism and his followers Hermesianes; maintained that the Church should teach its doctrines on the basis that pure reason is innate in every soul, enabling it to decide on all principal truth, a principle formally condemned at Rome, 1835.

Hermes Trismegistus (hêr'mēz trĭs-mē-jĭs'-tŭs), name applied by the Greeks to the Egyptian god Thoth of Hermopolis. The title *Trismegistus* probably was derived originally from the form in which the name of Thoth appears in the hieroglyphic writing as "twice-great" or "thrice-great." Thoth was the reputed author of the secret sacred books of the Egyptians. Since he was the patron of literature and the inventor of writing, Hermes, the Greek equivalent, was chosen as a sort of pseudonym under which a considerable literature appeared during the second and succeeding centuries, which from its general nature has been called "Hermetic," and which is almost entirely Egyptian in its origin. In general, these books contained matter of a religio-philosophical sort, and under the influence of Neoplatonism their purpose was to crush the rising Christianity; but later the name was applied to a large range of writings which endeavored to use the Neoplatonic philosophy, some of the doctrines of Gnosticism, Philonic Judaism, and cabalistic theosophy to form a substitute for Christianity. A number of works written in the Middle Ages by alchemists, and in later times perhaps by the Rosicrucians, profess to have been written by Hermes Trismegistus. The Zabians of the East have writings in Greek which they ascribe to Hermes.

Hermione (hêr-mī'ō-nē), in Greek mythology, the daughter of Menelaus and Helen; was given in marriage to Neoptolemus, though betrothed to her cousin Orestes before the Trojan War. After Neoptolemus was slain by Orestes in Delphi, whither the former had gone to consult the oracle with reference to Hermione's barrenness, she married her first love.

Her'mit. See ANCHORITE.

Hermit Crab. See CRAB.

Hermit Na'tion, designation first given to Japan and afterwards to Korea, because of their early disinclination to hold commercial and other intercourse with outside people.

Hermogenes (hêr-mŏj'ĕ-nēz), Greek orator and rhetorician; b. Tarsus in Cilicia; flourished at Rome in the reign of Marcus Aurelius. When seventeen he became a public teacher of rhetoric, and at eighteen or twenty composed his rhetorical system, which was for centuries the standard text-book. In his twenty-fifth year he lost his memory, and sank into imbecility, but survived his faculties many years. Five of his works, forming a "System of Rhetoric," are extant.

Her'mon, Mt., highest elevation of the whole Syrian system of mountains, and the N. boundary of the land of Israel; formed by a spur

from Anti-Lebanon, which separating the valley of Cœle-Syria from that of the Jordan, unites to the W. with the range of Lebanon. Great Hermon, or Mt. Hermon proper, is 9,200 ft. high. Its top is generally covered with snow, and is visible from Tyre and Damascus. Mt. Hermon was probably the scene of the Transfiguration. To the Druses it is a sacred mountain, and by them called "Mountain of the chief" (head of the Druses).

Hermon'this (modern, ERMONT), Egyptian city of the Old Kingdom; on the W. bank of the Nile, 9 m. S. of Thebes; was an important center before Thebes became the national capital, and regained its importance after the fall of Thebes. In early time it was, with Heliopolis, a seat of the sun worship. The deity of Hermonthis was Mont, the god of war, a local form of Amon, who was at a later date conceived as united with Ra, the sun god, as Mont-Ra.

Hermopolis (hĕr-mŏp'ō-lĭs), chief town on the island of Syra, one of the Cyclades, Grecian Archipelago; on the E. coast of the island, and is a stopping place for steamers from the W. or S. going to Smyrna or Marseilles. Pop. (1907) 17,773.

Hermop'olis Mag'na, ancient city, called *Chmunu* (modern ASHMUNEN); capital of the fifteenth (Hermopolitan) nome of Upper Egypt; existing as early as the time of Khafra in the fourth dynasty. It was the "City of the Eight" aboriginal divine powers of the world with Thoth at the head, whose sanctuary was here.

Hermosillo (hĕr-mō-sēl'yō), capital and principal city of the State of Sonora, Mex.; near the confluence of the Sonora and San Miguel rivers; is the center of an important wheat, corn, and wine district. Hermosillo is the old presidio of Pictic. The city has a mint and assay office. Pop. (1900) 17,618.

Hernandez (ĕr-nän'dĕth) **de Cor'dova, Francisco.** See CORDOVA.

Hernandez de Oviedo y Valdés (dē ō-vē-ā'-thō ē väl-thās'), **Gonzalo.** See OVIEDO Y VALDÉS.

Her'nia, or **Rup'ture,** protrusion of any organ from its natural cavity through an abnormal or accidental opening. The term is usually restricted to signify the protrusion of abdominal viscera through the abdominal wall. The predisposing cause of hernia is weakness or deficiency in the abdominal wall and the direct cause is usually violent bodily exertion, which overstrains the abdominal muscles. The protruding part is called the "hernial sac" and consists of a portion of the peritoneum, corresponding to the size of the rupture, covered by the skin and the tissues beneath it; it contains, ordinarily, a portion of the small intestine. Hernia is classed as reducible or returnable, irreducible, and strangulated. In reducible hernia the protruding part may be pressed back into the abdomen and held there by a supporting brace or "truss" until the retaining tissues become sufficiently strengthened to prevent a reprotrusion; sometimes hernia will return to its cavity spontaneously. In irreducible hernia the protruding sac cannot be returned to the cavity. Hernia is said to be strangulated when it is so tightly restricted that it cannot be returned, or the contents of the protruded bowel cannot be moved onward.

The symptoms accompanying hernia are indigestion, constipation, colic, flatulence, and dragging pains in the loins. The treatment of irreducible hernia is palliative quiet, regulation of the bowels, and the restraining of the protrusion by a protective support. In strangulated hernia the symptom of the lesser forms of the malady are intensified with vomiting and intense pain. Unless surgical operation is resorted to peritonitis follows.

He'ro, or **He'ron,** abt. 285–22 B.C.; ingenious mechanical philosopher of Alexandria; pupil of Ctesibius; famous for an acquaintance with the principles of pneumatics and hydraulics quite in advance of his age; wrote a number of books and invented a variety of machines, two of which, the Æolipile, and the fountain which bears his name, are still among the familiar forms of illustrative apparatus in the physical lecture room. Hero's fountain is shown in the annexed figure, in which it is seen that the elastic force of a confined body of air, increased by hydraulic pressure and reacting upon the surface of water in a closed reservoir, produces a jet which may rise (theoretically) above that surface to a height equal to the effective height of the pressing column.

HERO'S FOUNTAIN.

Hero, priestess of the Temple of Aphrodite at Sestos, on the coast of Thrace; loved by Leander, a native of Abydos, on the opposite shore of the Hellespont. Guided by the light of the torch which Hero planted on the cliffs of Sestos, Leander used to swim across the sea to meet her, but one night the storm put out the torch, and, when next morning Hero discovered the corpse of her lover floating on the waves, in despair she threw herself from the cliff into the sea.

Her'od, surnamed THE GREAT, b. 62 B.C.; King of the Jews; b. Ascalon in Judea; was of Idumean descent. When, 47 B.C., his father, Antipater, was made procurator of Judea by Julius Cæsar, he himself received the government of Galilee, to which was afterwards added that of Samaria and Cœle-Syria. He was expelled for a short time by Antigonus, the

nephew of Hyrcanus II and the representative of the Asmonean dynasty, but in Rome his claims were recognized by the Senate, and the title of King of Judea was conferred on him, 40 B.C. He established himself by force in Jerusalem, and by unheard-of cruelty maintained his power. All members of the old dynasty, even his own wife, Mariamne, the daughter of Hyrcanus II, and the three children he had by her, were executed. The slaughter of the infants at Bethlehem was so common and insignificant an affair that Josephus does not mention it. A few days before he died he had his son, Antipater, strangled; but, though cruel, his government was vigorous and brilliant. There was peace in Judea; commerce and industry prospered; literature and art flourished. He founded Cæsarea, rebuilt Samaria under the name of Sebaste, and adorned Jerusalem with numerous splendid structures. The Jews, however, found in his government a leaning toward Rome, which they hated; and the latter part of his life was troubled by conspiracies and riots. He was ten times married; died a few weeks after the birth of Christ.

Herod Agrip'pa I, 11 B.C.–44 A.D.; king of the Jews; son of Aristobulus, brother to Herodias, and grandson of Herod the Great; was educated in Rome, and received from Caligula the tetrarchate of Judea with the title of king, 37 A.D., and after the banishment of Herod Antipas, Claudius gave him all the old provinces of Judea. He was much liked by the Jews, especially for his vigorous measures against Christians; he had the apostle St. James the Greater beheaded and St. Peter thrown into prison.

Herod Agrippa II, abt. 27–100; Prince of Chalcis and King of N. Palestine; son of the preceding; was, like his father, educated in Rome, and resided there, at the court of Claudius, at the death of Agrippa I. He did not inherit his father's dominions, however; they were made a Roman province, and Herod Agrippa II obtained at first, 50 A.D., only the small kingdom of Chalcis. Abilene and Trachonitis were subsequently added. In 60 A.D., when he went down to Cæsarea to compliment Festus, the Roman governor, the apostle St. Paul appeared before him. In the Jewish war he sided against his countrymen, and after the destruction of Jerusalem, 70 A.D., resided in Rome, where he died.

Herod An'tipas, Tetrarch of Galilee and Perræa; son of Herod the Great and his wife Malthace; was named in his father's will as his successor, but obtained from the Romans only the tetrarchy; divorced his first wife and married Herodias, his half-brother Philip's wife; was thereupon rebuked by John the Baptist, who lost his life in consequence. During a visit to Jerusalem for the purpose of celebrating the Passover, Christ appeared before him, sent by Pilate as a former resident of his tetrarchate. In 42 A.D. Herod journeyed to Rome to obtain the royal dignity, but, through the intrigues of Herod Agrippa, he was exiled by Caligula, and died at Lyon.

Herod Phil'ip I, son of Herod the Great and Mariamne; married Herodias, by whom he had a daughter, Salome. He was remanded by his father's will to private life.

Herod Philip II, d. 34 A.D.; Tetrarch of Iturea and Trachonitis; son of Herod the Great and Cleopatra; succeeded his father as tetrarch on the latter's death; was by far the best of the Herodian family; built Cæsarea Philippi; married Salome, daughter of Herod Philip I; died in Bethsaida.

Hero'dians, Jewish party in the time of Christ. They were partisans of the Herod family, whose tyranny they preferred to that of the Romans. They appear to have been mostly Sadducees.

Herodia'nus, Greek scholar of the second half of the second century A.D.; son of Apollonius Dyscolus. Born at Alexandria, he went early to Rome, where he enjoyed the favor of Marcus Aurelius. Among the vast mass of his grammatical treatises, which were remarkable for their learning, accuracy, and system, especially conspicuous was his work on accent.

Herodianus, Greek historian, lived for a long time in Rome, and wrote in the Greek language a work in eight books on the history of Rome from the death of M. Aurelius, 180 A.D., to the accession of Gordianus III, 238 A.D., narrating events, as he informs us, which had occurred in his own lifetime.

Herod'otus, called the FATHER OF HISTORY, 484–24 B.C.; Greek historian; b. Halicarnassus, Caria; belonged to a wealthy and prominent family; conspired against Lygdamis, a vassal of Persia, and was forced to withdraw, probably abt. 460; was restored a few years later; but in consequence of new troubles at home, again withdrew, and joined the colony of Thurii, lower Italy, where he died. Much of his life was spent in travel; Asia Minor, Athens, and lower Italy he knew, but modern criticism declines to accept the statements of his travels into still more distant lands as so many evidences of personal knowledge, which limits his exploration of the Persian Empire and his range of travel in Egypt.

Herodotus marks the passage from logography to history, and is recognized on all hands as the first true historian. His history is the story of the long struggle between East and West, culminating in the liberation of West from East, of Greece from Persia. His view of the historian's calling was broad and penetrating, and his picture of the world as he saw it, or conceived it, is, for all the errors in drawing, beyond all price.

Hero'ic Age, the more than half-mythical age of Grecian history preceding the true historic period. In it the heroes, who were often of half-divine descent—great warriors, kings, navigators—are the central figures. In later times the heroic age furnished abundant material for dramatic and epic poetry, and the heroic character afforded many noble examples of fortitude, piety, purity, and justice which the Greek people too generally failed to imitate.

Heroic Me'ter, in English verse, the unrhymed iambic pentameter, known as blank verse. In Greek and Latin poetry it is the common hexameter verse, in which the "Iliad" and the "Æneid" are written. German and Italian heroic verse is of the same meter as the English. The French heroic is an iambic hexameter. The name is given because these meters are deemed appropriate to lofty themes.

Hérold (hā'rōld), **Louis Joseph Ferdinand,** 1791–1833; French composer; b. Paris. His first pieces, which were comic and very successful in their day, are obsolete. "Zampa" and "Le Pré aux Clercs," his greatest operas, still hold the stage in Europe, but are unknown in the U. S. except by fragments.

Her'on, any wading bird of the family *Ardeidæ*, a group containing the majority of species of the order *Herodiones*. The heron has a sharp-pointed bill, longer than the head, the toes long, all on the same level, and fitted for perching. The wings are ample and rounded, and flight is performed with deliberate wing beats. Herons nest as a rule in colonies, usually on trees and bushes in swampy localities, and feed on fish, frogs, small reptiles, young birds, and even small mammals. They are found throughout the temperate and tropical regions of the globe, in swamps, by the borders of lakes and rivers, and along the seashore. Many species are adorned, during the breeding season, with crests, and some with loose flowing plumes covering the back. These latter species are commonly termed egrets, but the name does not, as is sometimes supposed, have any exact signification. Herons are often popularly called cranes, but they are only distantly related to those birds, from which they may be distinguished by having the top of the head completely feathered, and by having the hind toe long and on a level with the others.

PURPLE HERON.

Heroöp'olis, Egyptian city in the E. Delta region; mentioned in the Septuagint version of the Old Testament as the place where Joseph met Jacob. In the same passage the Coptic version reads *Pethom*, corresponding to the Hebrew *Pithom*, one of the "store cities" built for Rameses II by the Israelites. It had been long known from Egyptian geographical lists that Pithom, "House of Tum," lay in the land of *Theku-t*, a name identified by Brugsch with Succoth, the second station in the Exodus route of the Israelites. The excavations of Naville, 1883, resulted in the discovery of the site of Pithom and Succoth. The mound thus excavated was about 12 m. W. of Ismailiah, on the line of the Suez Canal. Here, then, was the store city Pithom and the head of Red Sea navigation. It is necessary, therefore, to assume that down to the beginning of our era the Red Sea extended farther to the N. than now, and that the place of the crossing of the Israelites may have been far to the N. of the traditional place at Suez.

Herophilus (hē-rōf'ĭ-lŭs), Greek anatomist; b. Bithynia; flourished abt. 300 B.C.; lived at Alexandria, and acquired great reputation both as a teacher and practitioner; is generally thought to have been the first who actually studied and taught anatomy from the dissection of human bodies, and many of the anatomical names now in use originated with him; is also considered to have laid the foundation of the science of pathological anatomy, the study of which was recommenced by Morgagni 2,000 years later. His works are known mainly through quotations.

Heros'tratus, an Ephesian, who in 356 B.C., on the same night in which Alexander the Great was born, set fire to the Temple of Diana at Ephesus, one of the most magnificent buildings of antiquity, in order to make his name immortal by destroying one of the Seven Wonders of the world. He succeeded, though the Ephesians passed a decree that he should never be named. His name was divulged by Theopompus.

Her'pes, a name applied to several skin diseases, characterized by the development of a series of vesicles or clusters of vesicles, which generally run a definite, self-limited course. The most important of these diseases is *Herpes zoster, zona,* or "shingles," as it is called. This may surround one thigh or one arm with a band of vesicles, or more frequently it starts from the backbone and follows an intercostal space half round the body. More rarely it goes half round the neck or half across the face. Usually there is some neuralgic pain, and sometimes considerable fever. The disease must depend upon some abnormality in the nervous action, as it frequently maps out upon the surface the part of the integument supplied by some one branch of a nerve. It almost never goes more than halfway around the body, and there would be no danger if it should, for the disease is a self-limited or cyclical one, and the patient is sure to get well if let alone. A very common form of *herpes* is that which appears about the mouth, and is commonly called "fever blisters." There are usually seen a few vesicles containing clear or turbid fluid, which do not rupture, but after a short time dry up and disappear. They usually occur with slight fevers, "cold," or digestive disturbance.

Herpetol'ogy, that branch of zoölogy which treats of the structure and classification of reptiles, or the natural history of *Amphibia* and *Reptilia* (*q.v.*). Amphibians and reptiles, notwithstanding their external resemblances, have very little true affinity, and, indeed, the closest relations of such are with other types; thus the amphibians are so closely connected with the fishes that by many (*e.g.*, Huxley) they are combined in one peculiar group under the name *Ichthyopsida*; while, on the other hand, the reptiles and birds agree so thoroughly, and when the extinct forms are re-

called differ in so few characters, that they are also united in a special group, the *Sauropsida*. The orders now generally adopted for the inclusion of all these various members of the classes in question, recent and fossil, are as follows:

CLASS AMPHIBIA OR BATRACHIA.

Order *Stegocephali* (extinct).
" *Urodela* (salamanders, etc.).
" *Anura* (frogs, toads, etc.).
" *Gymnophiona* (Cæcilians).

CLASS REPTILIA.

Order *Ichthyopterygii* (extinct whale-like reptiles)
" *Testudinata* (turtles and tortoises).
" *Theromorpha* (extinct).
" *Plesiosauria* (extinct swimming reptiles).
" *Ornithosauria* (extinct flying reptiles).
" *Dinosauria* (extinct).
" *Rhynchocephalia*.
" *Crocodilia* (crocodiles).
" *Sauria* (lizards).
" *Ophidia* (Snakes.)

Herrera (ĕr-rā'rä), **Fernando de,** 1534–97; Spanish poet; b. Seville; was an ecclesiastic, and a friend of Cervantes. His best poems are mostly sonnets, odes, and elegies. He also wrote in prose a history of the war of Cyprus and the battle of Lepanto, and "Vida y Muerte de Tomás Moro."

Herrera, Francisco de (the ELDER), 1576–1656; Spanish painter; b. Seville; virtually founded a new school by his bold and spirited drawing. His most noted picture is the "Last Judgment" in the Church of St. Bernard in Seville. He excelled in painting fairs and market scenes, and etched several plates from his own compositions.

Herrera, Francisco de (the YOUNGER), 1622–85; Spanish painter; b. Seville; son of the preceding; excelled in pictures of still life, flowers, and fish, and became painter to the king and superintendent of the royal works. One of his best pictures is the "Assumption of the Virgin," in the convent of Nuestra Señora de Atocha, Madrid.

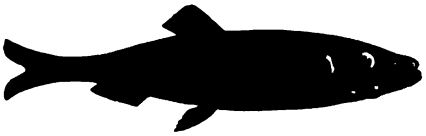
Herrera y Tordesillas (-ē tōr-dä-sēl'yäs), **Antonio,** 1559–1625; Spanish historian; b. Cuillar, Segovia; was by Philip II made chief chronicler of America and one of the chroniclers of Castile, and retained these places under Philip III and IV. His chief work, a general history of America, 1492–1554, in the form of annals, is the principal fount from which later writers on the subject have drawn their information.

Her'rick, Robert, 1591–1674; English poet; b. London; became vicar of Dean Priors, Devon, 1629; is one of the most charming of English lyric poets; was ejected from his living by the Long Parliament, 1648, but restored, 1660. His chief publication was the "Hesperides," 1647–48, poems treating of love, rustic life, parish festivals, etc.

Her'rig, Hans, 1845–92; German dramatist, editor and poet; b. Brunswick; began the practice of law, but soon dropped it and became associate editor of the *Deutsches Tageblatt*. Works include the dramas "Jerusalem," "Alexander the Great," "Nero."

Her'ring, John Frederick, 1795–1865; English painter; b. Surrey; was originally a stage-coachman; taught himself to paint animals, and for thirty-three years took the portraits of the winners of the Doncaster St. Leger. Many of his farmyard scenes are extensively known through engravings. One of his best-known pictures is "The Members of the Temperance Society."

Herring, common name of the very important food fishes of the genus *Clupea*. There are several species, the chief of which are the *C. harengus* of N. Europe and America, and the *C. mirabilis* of the Pacific coast of N. America. The celebrated whitebait is the



AMERICAN HERRING.

young of the herring. The herring fisheries of N. America are prosecuted chiefly along the New England coasts, and especially in British-American waters. Herrings at tolerably regular periods visit extensive lines of coast. They are generally caught in gill nets or scoop nets. The annual catch of herrings must amount to many hundreds of millions. A large part of the so-called herring caught in the U. S. are alewives, which are in nowise inferior to the real herring, which they much resemble.

Her'ron, Francis Jay, 1837–1902; American military officer; b. Pittsburg, Pa.; entered the army, 1861, as captain First Iowa Volunteers; engaged in the battles of Dug Springs, Ozark, and Wilson's Creek; promoted to lieutenant colonel Ninth Iowa Volunteers; commanded the regiment through campaigns in Missouri, Arkansas, and Indian Territory. He was appointed brigadier general of volunteers, 1862; commanded the Army of the Frontier at battles of Prairie Grove and Van Buren; promoted to major general of volunteers, 1862; was in command of the left wing of investing forces at Vicksburg, and of the army and navy expedition that captured Yazoo City. In May, 1865, negotiated, and in June received, the formal surrender of the Trans-Mississippi Army and all Confederate forces W. of the Mississippi; was one of the commissioners to negotiate treaties with Indian tribes, 1865; U. S. marshal District of Louisiana, 1867–69; Secretary of State of Louisiana, 1870–72.

Her'schel, Caroline Lucretia, 1750–1848; English astronomer; b. Hanover, Germany; sister of Sir William Herschel; went to England to live, 1772; was appointed assistant astronomer to George III, 1781, with a moderate salary; attended her brother in all his night watches; wrote from his dictation his observations; noted the clocks; reduced and arranged his journals; prepared the zone catalogues for his sweeps, and other laborious mathematical calculations; discovered independently eight comets, besides numerous nebulæ and clusters of

stars. At the death of her brother, 1822, she returned to her native city, where she spent the remainder of her life. She was elected member of the Royal Astronomical Society, 1832, and received a gold medal from the King of Prussia, 1846.

Herschel, Sir John Frederick William, 1792–1871; English astronomer; b. Slough, England; son of Sir William Herschel. Abt. 1825 he began his observations in sidereal astronomy, to which he chiefly devoted himself. His great enterprise was his expedition toward the close of 1833 to the Cape of Good Hope to take observations of the S. firmament. His labors there continued four years, and the entire expense was defrayed by himself. In 1847 appeared his "Results of Astronomical Observations at the Cape of Good Hope," one of the most considerable and valuable works of our time. His residence at the Cape gave not only valuable additions to astronomy, but also to meteorology. He suggested the plan of taking simultaneous meteorological observations at different places on given days. Before going there he added 800 nebulæ to the catalogue of his father, and on his return published a catalogue of 2,049 nebulæ of the S. hemisphere and their positions. He also added while at the Cape 1,081 double stars. His observations on the Milky Way, on the brightness and the color of stars, on variable stars, on the sun's rays, on the atmospheric air, and on the Magellanic clouds, are all very valuable. Sir John did not confine his attention to astronomy, but made valuable researches in light, sound, and celestial physics. His best-known work is his "Outlines of Astronomy."

Herschel, Sir William, 1738–1822; English astronomer; b. Hanover, Germany. His father, a musician, educated him to his own profession. In 1757 he went to England to seek his fortune, and became organist at Halifax, and, 1766, at Bath. Here he first turned his attention to the study of astronomy, particularly to the construction of optical instruments, in which he learned to excel. With one of his own telescopes, magnifying 227 times, Herschel began a careful survey of all the stars, serially; and while examining the constellation of Gemini, he discovered (March 13, 1781) a planet which he proposed to name the Georgium Sidus. It has often been called Herschel, but the name Uranus has been generally adopted. Herschel also discovered two of its satellites. The discovery of Uranus attracted the attention of all Europe, and Herschel was made private astronomer to the king, with a salary of £400 and a house near Windsor. With funds advanced by the king, Herschel constructed his celebrated 40-foot reflecting telescope, the metal speculum of which was 4 ft. in diameter, 3½ in. thick, and over 2,000 lbs. in weight.

Though Herschel discovered an almost unprecedented number of bodies in the planetary system, yet his glory is greatest in sidereal astronomy. His leading discoveries and labors in this branch of the science were the following: (1) The binary system of stars, and the orbits of several revolving stars. (2) The classification of the nebulæ, and advocacy of the nebular hypothesis. (3) The law of grouping in the entire visible firmament. He "gauged" the heavens, by counting the whole number of stars visible in the field of his 20-foot reflector, and taking the average for each region. (4) The determination of the fact of the motion of our system, and the direction of that motion. Besides discovering the satellites of his own planet, Herschel discovered two new satellites of Saturn, now called the first and second. His researches on heat and light and studies on sun spots are also valuable. He contributed numerous papers to the "Philosophical Transactions."

Herschell, Farrer (Lord), 1837–97; British statesman; called to the bar, 1860; became Q. C., 1872; recorder of Carlisle, 1873; in Parliament, 1874–85, representing Durham city as a Liberal; knighted, 1880, and made Solicitor-General in Mr. Gladstone's ministry; raised to the peerage, 1886; Lord High Chancellor, 1886; and, 1892–95; president of the Anglo-American commission to settle existing differences between the United States and Canada, 1899, and died in Washington.

Hersent (ĕr-sōṅ'), **Louis,** 1777–1860; French painter; b. Paris; one of the most characteristic representatives of French painting during the Restoration; obtained the Prix de Rome, 1797. In 1802 he exhibited in the Salon "Metamorphosis of Narcissus," and, 1831, portraits of Louis Philippe and Queen Amélie. His pictures were generally of historical subjects.

Hertz, Heinrich, 1857– ; German electrician; b. Hamburg; became assistant to Prof. von Helmholt in the physical laboratory of Berlin Univ., and was a docent at Kiel, 1883–85. After serving for four years as professor in the Polytechnicum in Carlsruhe, he was elected to the chair of Physics in the Univ. of Bonn. Hertz's chief work consists in the demonstration of the fact, previously theoretically established by Maxwell, that electromagnetic induction is propagated through space at the velocity of light by means of a wave motion in all respects identical with that by means of which radiant energy is transmitted. See HERTZIAN WAVES.

Hertz, Heinrich, 1798–1870; Danish dramatist; b. Copenhagen; was of Jewish parentage, but embraced Christianity, 1832; works include the tragedy "Svend Dyring's House"; the character comedy, "The Savings Bank"; the romantic play, "King René's Daughter"; the vaudeville, "Love and Politics"; also "Poetical Epistles from Paradise," a defense of Heiberg's system.

Hert'zen, Alexander, 1812–70; Russian journalist and political writer; b. Moscow; was twice banished for his outspoken, liberal ideas, and, 1851, settled in London, where he set up a *Free Russian Press* to attack the Russian Govt., and edit works forbidden in his native land; founded, 1857, a weekly paper, *The Alarm Bell*, whose influence was immense; transferred it to Geneva, where it existed until about a year before his death. He revealed state secrets, and published "Memoirs of the Empress Catherine, Written by Herself," which

had been kept private by her imperial descendants. His works, many of them published under the pen name "Iskander," include the novels "Doctor Krupov" and "Whose Fault Is it?" "Dilettanteism in Science" and "Baptized Property" (*i.e.*, serfs).

Hertzian (hĕrts'ĭ-ăn) **Waves**, name given to an important phenomenon in electro-magnetic induction, the existence of which was first experimentally verified by Prof. Heinrich Hertz. Whenever in any circuit electro-magnetic changes are brought about, as when an induction coil is in action, the disturbances are transmitted in all directions, bringing about similar changes in all conductors in the neighborhood. Hertz's work consisted in showing that these disturbances are transmitted by means of vibrations of the luminiferous ether and in determining the character and measuring the velocity of these waves. The result of his researches has been to place the electromagnetic theory of light on a well-established experimental basis. Wireless telegraphy is also made possible by Hertzian waves.

Heruli (hĕr'ū-lī), Germanic race who first appear in history in the third century A.D. on the shores of the Euxine. They were conquered by the Ostrogoths under Hermanric in the fourth century, and bands of Heruli appear after this in all parts of Europe. In the valley of the Theiss, on the Lower Danube, and in Illyria they founded governments, and were everywhere among the bravest and most barbarous and unruly of the Germanic peoples. Odoacer was called King of the Heruli, but was not of this race. After the fall of the W. Empire (476 A.D.) the Heruli became one of the dominant races, but the subject Lombards rose and almost annihilated them abt. 512 A.D. From that time they were important only as soldiers in the service of the more powerful tribes.

Hervé (ĕr-vā'), proper name FLORIMOND RONGER, 1825–92; French composer; b. Houdain; was successively a church organist, a director of orchestras and theaters, and at times an actor; wrote over fifty operettas, including "Don Quixote and Sancho Panza," "Little Faust," and "King Chilperic."

Hervey (hĕr'vĭ), **James**, 1713–58; English author; b. Hardingstone, Northamptonshire; took orders in the Anglican Church and held various rectorships, notably that of Weston-Favell; author of "Meditations and Contemplations among the Tombs," which became exceedingly popular; "Theron and Aspasia," consisting of dialogues on religious topics—a work which called forth replies from Robert Sandeman and John Wesley, and other works.

Herwarth von Bittenfeld (hĕr'värt fŏn bĭt'ĕn-fĕlt), **Karl Eberhard**, 1796–1884; German military officer; b. Grosswerther, Prussia; entered the army, 1811; took part in the campaign against France, 1814; became commander of the Seventh Army Corps, 1860. As general of infantry he commanded the Prussian troops against Denmark, and took the island of Alsen; as commander in chief of the Army of the Elbe, 1866, gained victories at Hünerwasser and Münchengrätz, and destroyed the Austrian left wing by taking the villages of Problus and Prune; in the war with France, 1870, was governor general on the Rhine and of all the W. provinces; retired from active service, 1871, as field marshal general.

Herwegh (hĕr'vĕkh), **Georg**, 1817–75; German poet; b. Stuttgart; was drafted into the army, quarreled with his lieutenant, and fled to Switzerland, where (at Zurich), 1841, he published his "Poems of a Living Man," a collection of political poems or songs full of enthusiasm for liberty and equality. The book met with immense success, and the poet returned to Germany, 1842; but a virulent letter he wrote to the King of Prussia caused him to retire a second time to Switzerland. He took an active part in the revolution in Baden, 1848, but passed the latter part of his life in S. France, almost in obscurity.

Herzeberg (hĕrt'zē-bĕrkh), **Ewald Friedrich**, 1725–95; Prussian statesman and author; b. Lottin, Pomerania; entered the service of the Prussian Ministry of Foreign Affairs, 1747; wrote, 1756, the famous "Mémoire raisonné," founded on papers stolen from the archives of Dresden, and intended to defend the invasion of Saxony by Frederick II; negotiated the Peace of Hubertsburg, 1763; brought about the formation of the so-called Fürstenbund against Austria; 1785 was made first Minister of State by Frederick II, but retired 1790.

Herzegovina (hĕrt-sē-gō-vē'nä), with Bosnia a province of Austria-Hungary; bounded N. by Bosnia, SW. by Dalmatia, and E. by Montenegro. Area, about 3,500 sq. m.; peopled largely by Slavic races; occupied by the ridges and valleys of the Dinaric Alps; produces much grain, tobacco, and honey; capital, Mostar. See BOSNIA.

Herzog (hĕrt'sōg), **Johann Jakob**, 1805–82; German Protestant theologian; b. Basel, Switzerland; Prof. of Theology at Lausanne, 1835–45; at Halle, 1847–54; at Erlangen, 1854–77; chief work "Encyclopædia of Useful Information for the Protestant Theology and Church," which he edited, and to which he contributed over 500 articles.

He'siod, lived abt. 735 B.C.; next to Homer, the oldest of the Grecian poets whose works are known to us; b. Asera, Bœotia; left home, having been defrauded by his brother, and became a strolling minstrel with homes at Naupactus and Orchromenus; according to a tradition, was murdered at Œneon, Ozolian Locris; was buried in Locris, but reëntombed at Orchromenus; chief works attributed to him: "Works and Days," directions given for various kinds of labor, with a calendar of the days on which certain tasks are to be undertaken; "Theogony," an attempt to systematize the world of Hellenic deities; "Catalogue of Women," "The Shield of Hercules," an imitation of the shield of Achilles in the "Iliad." Like Homer, he used the hexameter, and the dialect is substantially the same. The Greek valued Hesiod as he valued Homer for his moral lessons, and the homely preacher of the Gospel of Labor

was a power in Greek education, and in certain forms of reflective poetry a power in Greek literature.

Hesperides (hĕs-pĕr'ē-dēz), in Grecian mythology, the guardians of the golden apples which Terra gave to Juno as a wedding gift. Sometimes they are called the daughters of Erebus and Night, sometimes of Atlas and Hesperis, sometimes of Jupiter and Themis. They were commonly said to be four, whose names were Ægle, Erythia, Hestia, and Arethusa. Their gardens were originally placed in the remote W., about Libya and Mt. Atlas, but later mythologists placed them in Cyrenaica, and some even in the extreme N. among the Hyperboreans. Their duty was to guard the apples which Juno had committed to their care, but Hercules obtained the apples by the assistance of Atlas.

Hess, Heinrich von, 1798–1863; German painter; b. Düsseldorf; son of Karl Ernst Christoph Hess; became professor in the Academy of Munich, 1826; excelled in cartoons and frescoes of religious subjects. The Church of All Saints, Munich, contains work by him.

Hess, Karl Adolf Heinrich, 1769–1849; German painter; b. Dresden; was a professor in the Academy of Vienna; excelled as a painter of and writer on horses; chief work "March of the Cossacks of the Ural through Bohemia," 1799.

Hess, Karl Ernst Christoph, 1755–1828; German engraver; b. Darmstadt; became professor in the Academy of Arts at Düsseldorf, 1782, and afterwards was employed to engrave many of the best works in the gallery, including a "Holy Family" by Raphael, and the "Ascension of Mary" by Guido Reni. Abt. 1806 he settled in Munich.

Hess, Peter von, 1792–1871; German painter; b. Düsseldorf; son of Karl Ernst Christoph Hess; served in the campaign against the French, 1813–15, and on account of his battle pieces, from sketches made in the field, became known as "the Horace Vernet of Germany." Invited by the czar, he went to Russia, 1839, and there painted twelve battle pictures for that monarch; works include "Battle of Arcis-sur-Aube," "French Wagon Train," "Battle of Leipzig."

Hesse (hĕs), mountainous territory in the W. part of central Germany; between the Neckar, Rhine, Main, Lahn, and Fulda. It was inhabited by the tribe of the Catti at the time of Germanicus, but the Catti became lost as an individual tribe among the Franks, and when these emigrated to Belgium and France the Hessian territory became nearly depopulated. Meanwhile the Saxons pushed into the country from Thuringia, and for a period (until 1263) Hessia was united with the Thuringian principality. Ludwig the Child founded the Hessian dynasty. One of his descendants, Philip the Magnanimous, divided his land at his death, 1567, between his four sons, William IV, Ludwig IV, Philip II, and George I. But Ludwig IV died 1604 and Philip II 1583, without children, and thus only two branches of the family were continued—that of Hesse-Cassel, descending from William IV, and that of Hesse-Darmstadt, descending from George I. In the time of the Revolution in N. America (1775) the Grand Duke of Hesse-Cassel held his subjects as mercenaries, and sold to George III of England the service of 22,000 Hessian troops with which the British army in N. America was reënforced. In the time of the Napoleonic wars Hesse-Cassel, under William I, fought now on one side and now on another. In 1866 Hesse-Cassel, having joined Austria against Prussia, was conquered by the latter power, and has since been a district of the Prussian province of Nassau.

Hesse-Darmstadt (-därm'stät), or, more properly HESSE; grand duchy and state of the German Empire; comprises mainly two distinct parts: Upper Hesse (Oberhessen), completely surrounded by the Prussian province of Hesse-Nassau, and the provinces of Rhenish Hesse (Rheine Hessen) and Starkenburg, this S. portion being bounded N. and W. by Prussia, E. by Bavaria and Baden, S. by Baden and Rhenish Bavaria; area, 2,968 sq. m.; pop. (1905) 1,209,175. The country is mountainous or hilly, covered by Vogelsberg, Odenwald, and spurs of Taunus and Westerwald, but the soil is very productive and well cultivated. Wheat, fruit, barley, potatoes, and tobacco are raised; some iron, salt, and brown coal is mined; linen and woolen fabrics, leather and straw goods, are manufactured; the carriages from Offenbach are celebrated. The legislative power is vested in two chambers, the first composed of the princes of the reigning family, the heads of a number of noble houses, the Roman Catholic bishop, the chief Protestant superintendent, the Chancellor of the University (Giessen), two members elected by the noble landowners, and twelve life members, nominated by the grand duke; the second chamber consists of ten deputies of the eight larger towns, and forty representatives of the smaller towns and rural districts. A little more than two thirds of the population are Protestants. The largest towns are Mayence or Mainz, Darmstadt, the capital, Offenbach, Worms, and Giessen.

Hesse-Hom'burg, former German landgraviate, consisting of the province of Homburg, which was surrounded by the territory of Nassau, Hesse-Darmstadt, Hesse-Cassel, and Frankfort, and of Meisenheim, between Rhenish Prussia, the Bavarian Palatinate, and Birkenfeld; total area, 106 sq. m.; pop. (1864) 27,374. The little state was known abroad chiefly for the gambling tables at the watering place of Homburg, the capital. The last landgrave, Ferdinand, died 1866, when the country reverted to Hesse-Darmstadt, to which it had belonged before 1596. In 1866 it was ceded to Prussia.

Hesse-Nassau (-näs'â), province of Prussia (formed, 1866, of portions of the electorate of Hesse-Cassel, the duchy of Nassau, the landgraviate of Hesse-Homburg, and the free city of Frankfort); situated between Hesse, Bavaria, and the provinces of Saxony, Hanover, Rhenish Prussia, and Westphalia; area, 6,062 sq. m. The surface is occupied by the Spessart,

Rhön, Westerwald, and Taunus Mountains, but the soil is very fertile and well cultivated. Agriculture, cattle raising, and manufacture of cloth, iron, jewelry, and pottery are the chief occupations. Much excellent wine is produced. Mineral springs are numerous, and the watering places of Ems, Wiesbaden, Schlangenbad, and others are celebrated. Pop. (1905) 2,070,052.

Hessian (hĕsh'ăn) **Fly** (so called either because it was brought by the Hessian troops during the Revolution, or because the term "Hessian" was applied during and long after the Revolution to anything destructive or vexatious), the *Cecidomyia destructor*, a dipterous insect which is very destructive to wheat in parts of the U. S. In spring and autumn the larvæ crawl in between the stalk and the sheath of a leaf, and remain near the ground, head downward, sucking the juice. In five or six weeks they enter a semipupa or "flaxseed state," from which they go into the pupa, and then become perfect insects. They are destroyed in great numbers by insect parasites, and burning the stubble in the autumn will destroy a great proportion of their larvæ.

HESSIAN FLY.

Hes'tia, in Greek mythology, the first-born daughter of Cronus and Rhea; the virgin goddess of the hearth, and of sacrificial fire; identified with the Roman Vesta (*q.v.*).

Hesychasts (hĕs'ĭ-kăsts), body of mystics in the Greek Church, who professed that by retirement and contemplation they could come to behold the divine glory (called the "Taboritic light," because it was regarded as the same as that which shone at Christ's transfiguration on Mt. Tabor). They believed that the best position they could assume for beholding this light was to sit and gaze upon their navels. They flourished in the fourteenth century among the monks of Mt. Athos, but the leaven of their doctrine is not yet extinct in the East. Barlaam was their great opponent, but he was condemned in a synod in Constantinople, 1341, and ten years later, 1351, the doctrines of the Hesychasts were declared orthodox by another synod in Constantinople.

Hesychius (hē-sĭk'ĭ-ŭs), grammarian of Alexandria, under whose name a valuable Greek lexicon has come down to us. Nothing is known of his life, and his date is so uncertain that critics vary in regard to it from 390 A.D. to the tenth century. The former is more generally accepted. The work is based on the earlier lexicon of Diogenianus, and is valuable as containing explanations of words and forms and literary and archæological information derived in part from writers now lost.

Hesychius, of MILETUS; Greek philosopher and historian (surnamed "The Illustrious"); lived in the sixth century A.D. under the Emperor Justinian; wrote a synoptical history of the world, in six parts, from Belus, King of Assyria, to the death of Anastasius I; was also the author of a dictionary of authors.

Hetæræ (hē-tē'rē), euphemistic name given in Greece to the better class of prostitutes. In Corinth prostitutes were connected with the worship of Aphrodite; they were introduced into Athens by Solon, who thought thereby to prevent the Athenian families from being ruined by the licentious young men of Athens. Originally these prostitutes were slaves owned by the state, which derived a revenue from them. The hetæra was not a common prostitute; she was usually a foreigner, and she sought to please men not only by her personal charms, but also by the brilliancy of her intellect and conversation. The greatest and best men of Greece were attracted by them. Many of these hetæræ won immortal fame; some of them amassed huge fortunes; and some even reached the royal purple, and had temples erected in their honor. Some of the most distinguished were Thais, Myrrhina, Lamia, Leæna, Theodota, Thargelia, and Phryne, who served as model for Praxiteles.

Hetæria (hĕt-ă-rē'ă), society having for its original object the promotion of science and literature in Greece, but chiefly concerned during the early years of the nineteenth century with the project of Greek independence. Founded in the latter part of the eighteenth century, it was a flourishing organization at the time of the Congress of Vienna, 1814–15, and soon numbered among its members the ablest Greeks of all classes, though at first it was recruited mainly from the Greeks of foreign countries, especially Russia and the Danubian principalities. Ypsilanti, the leader of the ill-starred revolt in Wallachia and Moldavia, 1821, was the head of the Hetæria which supported that movement, as well as the more successful attempt in Greece proper. When by the intervention of the great powers Greek independence had been achieved, 1828, the society ceased to be an important factor in Greek politics.

Hexapla (hĕx'ă-plă), celebrated edition of the Old Testament presenting the original Hebrew, the Hebrew in Greek letters, the Septuagint, and the Greek versions of Aquilla, Symmachus, and Theodotion. Besides these, there were columns containing parts of three other Greek versions, whose authors are not known. Origen was the author of this great work, which he originally prepared as a tetrapla, giving four columns only.

Hexateuch (hĕx'ă-tūk), first six books of the Bible, *viz.*, Genesis, Exodus, Leviticus, Numbers, Deuteronomy, and Joshua—recently so called. The first five of these have long been called the Pentateuch. This name, introduced by early Christian writers, was appropriate, since these five formed a distinct division of the Jewish Scriptures called the Torah or Law, and were believed to have been written by a single author, Moses. Now, however, it is claimed by the "higher critics" that these books were not written by Moses, but that

they are a compilation from four principal documents by later writers, and that the book of Joshua belongs with them, the six books forming a literary unit properly entitled the Hexateuch.

Heyne (hī'nĕh), **Christian Gottlob,** 1729–1812; German classical scholar; b. Chemnitz; became, 1763, Prof. of Eloquence and Poetry, and, 1764, first librarian at Göttingen, where he remained until his death; was the first scholar to attempt a serious and scientific exploration of Greek mythology; most notable works exegetical editions of Vergil and an edition of Pindar.

Heyse (hī'zĕh), **Paul,** 1830– ; German poet and novelist; b. Berlin; son of Karl Wilhelm Heyse, a university professor and distinguished philologist; settled in Munich, 1854, and until 1868 held a court position; in translations from foreign authors showed himself one of the greatest living masters in Germany; numerous works include the tragedies "Francesca da Rimini," "Elizabeth Charlotte," "The Sabine Women," the poems "The Brothers," "Novels in Verse," and "The Bride of Cyprus," the romances "The Children of the World" and "In Paradise."

Hey'ward, Thomas, 1746–1809; American legislator; b. St. Luke's parish, S. C.; was early and prominently connected with the Revolutionary movement in N. Carolina; was, 1775–78, a delegate to Congress and signed the Declaration of Independence; was afterwards a judge in his native state, holding also a military command; was, 1780–81, a prisoner in the hands of the British at St. Augustine; was a member of the constitutional convention of 1790.

Hezeki'ah, thirteenth monarch of Judah; son and successor of Ahaz; reigned 723–695 B.C., inclusive; broke the images and the brazen serpent of Moses to which the people had offered incense, and restored the ancient worship; warred successfully against the Philistines, and refused to pay the tribute established by Tiglath-Pileser, King of Assyria; compromised with Sennacherib, who had invaded Judah, paying him a tribute of 800 talents of silver and thirty of gold, and spoiling the doors of the temple in order to do so. At some subsequent time and place not mentioned, the Angel of Jehovah, whose aid Hezekiah had invoked, destroyed the Assyrian army, forcing Sennacherib to retreat.

Hiberna'tion, a condition into which certain mammals (such, for example, as some of the bats, rodents, insectivores, bears, etc.) and many inferior animals, both vertebrate and invertebrate, pass in cold weather, the temperature of the blood being lowered nearly to that of the air, and many of the vital functions entering a state of abeyance. The power of the will over the muscles is quite suspended, and respiration is nearly abolished, while the muscular irritability in the case of the higher hibernating animals is remarkably increased. Meanwhile a very great loss of weight occurs from the slow destruction of the store of fat which the animal has laid up in the autumn. It is evident that animals feeding on insects and succulent vegetables could never survive a N. winter but for the state of hibernation which suspends the need of food. Accordingly, while N. bats and some bears hibernate, those of tropical regions do not. Somewhat analogous to hibernation is the long slumber which many reptiles, mollusks, and other inferior organisms undergo during the dry season in very hot countries. The animal becomes more or less completely desiccated, and from the loss of moisture the functions of life are suspended. This suspension also serves to preserve animal life in very untoward conditions. See ESTIVATION.

Hiber'nia, Iber'nia, Iver'nia, and **Ier'ne,** names under which Ireland is mentioned by the ancient writers—by Aristotle, Diodorus Siculus, Strabo, Pomponius Mela, Pliny, and Ptolemy.

Hibis'cus, large genus of malvaceous trees, shrubs, and herbs, often with large and showy flowers. The herbaceous species are numerous in the U. S., and are known as rose mallows. The best known of the shrubby species is *H. Syriacus*, which was introduced into cultivation from the Levant over two centuries ago. It is known in gardens and nursery catalogues as the shrubby althæa, the old name for it being *Althæa frutex*; it is also called rose of Sharon, a name that appears to be peculiar to the U. S. As it blooms late in summer, will grow in almost any soil, and presents such a great variety in its flowers, it is justly regarded as one of the most valuable ornamental shrubs.

ROSE OF SHARON (*Hibiscus Syriacus*).

Hiccough (hĭk'kŭp), spasmodic contraction of the diaphragm, producing a shock in the thoracic and abdominal cavities, and accompanied by a convulsive inspiration in which the column of air is arrested by the sudden closing of the glottis, and by a loud and well-known clucking sound. In nervous persons it may be brought on by any excitement, and it generally disappears with its cause; but it is sometimes symptomatic of peritonitis and strangulated hernia. Usually a few swallows of cold or acidulated water, cold sprinkling, or vivid emotion of any kind, will put an end to it in a few moments.

Hick'ok, Laurens Perseus, 1798–1888; American metaphysician; b. Bethel, Conn.; was Prof. of Theology in the Western Reserve College, 1836–44, and in the Auburn Theological

Seminary, 1844–52; became Prof. of Mental and Moral Science in Union College, 1852, and was its president, 1866–68; published "Rational Psychology," "Moral Science," "Empirical Psychology," "Rational Cosmology," "Creator and Creation," "Humanity Immortal, or Man Tried, Fallen, and Redeemed," and other works.

Hick'ory, common name of trees of the genus *Hicoria*, or *Carya* (of the family *Juglandaceæ*), often erroneously called walnut trees in New England. The hickory trees are N. American. Besides the pecan, there are four species known as shellbark or shagbark hickories, having excellent timber and nuts generally edible, the bark of the tree being very rough. The pignut or bitter hickories,

HICKORY.
1. Shellbark. 2. Mockernut.

on the contrary, have more generally a smooth bark, inedible nuts, and rather inferior wood. Hickory timber is excellent for handspikes, axhelves, spokes, barrel hoops, and the like. It is prized as fuel, but will not stand the weather. Most species of the hickory become noble trees, reaching a height of from 60 to 90 ft., with straight trunks and with symmetrical branches. When confined in the forest, they shoot up 50 or 60 ft. without any branches; but with sufficient room they expand into lofty pyramids of bold, pinnated foliage.

Hicks, Elias, 1748–1830; American preacher of the Society of Friends; b. Hempstead, N. Y. His belief in his discovery of errors in the tenets of the Friends led to a schism in that body; those adhering to the old doctrines being especially termed Orthodox, while the followers of Hicks were called Hicksites. His theological writings were principally in an epistolary form.

Hicks-Beach, Michael Edward. See ST. ALDWYN, VISCOUNT.

Hick'site. See FRIENDS, SOCIETY OF.

Hidalgo (ē-dăl'gō), word applied in Spain to every noble man or woman, but strictly the title of the lowest order of nobility, constituting the *hidalguia*.

Hidalgo, one of the central states of Mexico; bounded N. by San Luis Potosí, NE. by Vera Cruz, SE. by Puebla, S. by Tlaxcala and Mexico, and W. by Querétaro; area, 8,917 m.; pop. (1900) 605,051; capital, Pachuca, pop. (1900) 37,487. The N. part is mountainous, culminating in the Cérro Canjando, 9,380 ft. high. The state is most celebrated for its very rich mines of silver, iron, copper, coal, lead, sulphur, etc., the annual product from which is about $5,000,000.

Hidalgo y Costilla (ē kōs-tē'yä), **Don Miguel,** 1753–1811; Mexican revolutionist; b. State of Guanajuato; was a priest; in early life was noted for the conscientious fulfillment of his ecclesiastical functions; is said to have introduced the silkworm into Mexico. Possessing much influence among the Indians, he formed the plan of a general insurrection, organized an army, captured several towns, and advanced against the capital, but was totally routed at the bridge of Calderon, January 17, 1811. Leaving the remnant of his forces at Saltillo, he set out for the U. S. to obtain arms and military aid; but was betrayed to the Spaniards, carried to Chihuahua, and shot.

Hide, originally, in English law, the portion allotted to each freeman constituting the freeman's homestead, with a portion of the arable lands and pasture lands of the town. Later, from the foregoing use, the word *hide* came to be used to designate a measure of area at first varying so greatly in different localities as not to be definitely ascertainable, but fixed in the twelfth century at from 100 to 120 acres. In the Doomsday Book the term is used as the name of a unit of assessment in calculating the danegeld, but is there used loosely, apparently referring rather to value than to area.

Hides, in commerce, the skins of large animals, such as domestic cattle, horses, and the buffaloes of the Old World. They appear in commerce either dried, salted, or in the undried and natural state. Hides are used chiefly in the manufacture of leather, and the fragments and waste go to the glue maker. The hair is also saved for plasterers' use, and is used to some extent in upholstery. *Domestic* hides are those sold in the green state, and manufactured into leather in the country where produced. The hides of general commerce are the product of S. America, S. Africa, Australia, India, California, Russia, etc. The hides of sheep, goats, deer, etc., are known in commerce as "skins." See LEATHER.

Hideyoshi (hē-dā-yō'shē), **Toyotomi,** 1536–98; Japanese general and statesman; b. Owari. Of low birth, he gradually worked his way up to power in the troublous times of the sixteenth century civil wars, and succeeded to the power of his patron Nobunaga. In 1586, having become virtual ruler of Japan, he caused the expulsion of Christian missionaries. He resigned his functions in favor of his son, 1591, receiving then the title of *Taiko*, which appears in the name *Taiko-Sama*, by which he is still popularly known.

Hierapolis (hī-ē-răp'ō-lĭs), ancient city of Phrygia, between the Lycus and Mæander rivers, celebrated for its warm springs and its

cave Plutonium, from which arose a mephitic vapor which was said to be poisonous to all but the priests of Cybele. It was the seat of a Christian church in the time of St. Paul, who mentions it in his epistle to the Colossians (iv, 13). Its ruins, with stalactites and incrustations formed by its warm springs, are found at an unoccupied place called Bambuk-Kalessi. It was the birthplace of Epictetus, the philosopher.

Hierapolis, or **Bamby'ce,** once splendid but now utterly ruined city of Cyrrhestica, in Syria; about 25 m. S. of Carchemish, on the road to Seleucia and Babylon. It stood on a rocky, barren plain, and derived its prosperity from the caravan trade. Its palmy days were under the Seleucidæ. Extensive ruins mark its site.

Hierarchy (hī'ėr-ärk-ī), or **Hierocracy** (hī-ėr-ŏk'rā-sī), the power, dignity, or office of a *hierarches,* a steward or president of sacred rites, one supreme in holy things, a high priest; general name for the whole of the clergy of a church, and also designating a government by priests. The angelic orders were early taken as the prototypes of the ecclesiastical hierarchy. Three orders of angels were enumerated, with three hierarchies in each—seraphim, cherubim, thrones; dominations, powers, principalities; virtues, archangels, angels. Milton adopts in "Paradise Lost" every one of these titles.

Among the Hebrews the hierarchy was hereditary, and its headship was in the high priest. In the Christian Church the hierarchy is the government of the Church by the clergy. The government of the Church was originally, at least relatively, popular in part (democratic hierarchy), and changed more and more into a spiritual aristocracy (aristocratic hierarchy). The line of historical advance is generally supposed by Protestant writers to have been from a government of perfect coördination among the presbyter-bishops of a congregation to the congregational and parochial episcopate, then to the diocesan episcopate. From this arose the metropolitan system, in which a governmental superiority was exercised by the bishops of the chief cities of the provinces. Then came the system of patriarchates, under which the bishops of the great sees of Rome, Constantinople, Antioch, Alexandria, and Jerusalem were recognized as patriarchs of the metropolitans. Civil events destroyed the prominence claimed for the last three.

The tendency to unification remained fixed at the patriarchate in the Eastern Church, but advanced in the Western Church till it culminated in the papacy. Among the earlier representatives of this tendency was Leo I (440–461). In the ninth century this papal hierarchy was greatly strengthened by the false Isidorian decretals. From the eleventh to the thirteen centuries the papacy had a political supremacy which was not successfully challenged. This it owed especially to several popes of distinguished ability and force of character. Gregory VII (1073–85), better known by his earlier name, Hildebrand, which made Hildebrandism the synonym of that hierarchical system of which he was so great a master. He made the papacy a universal theocracy of all Christian states, with the pope as Christ's vicar, by whom kings reigned; people and princes were simply, in different degrees, the virtual subjects of the pope. Innocent III (1198–1216), in many respects the greatest of the popes, finished the work of Hildebrand, and brought the hierarchy to the summit of its glory and power. Political independence and unlimited spiritual authority were the objects of his struggle. Boniface VIII (1294–1303), not inferior in intellectual force to his predecessors, but destitute of their nobler qualities, urged to the extremest point their principles of domination over the temporal power.

The influence of the Reformation on the hierarchical claims was marked. The part of European Christendom which sympathized with that movement rejected all these claims. All the Reformers declared against the whole hierarchical system. But even in the states which adhered to the Roman Catholic Church tendencies the papal power was more and more restricted and limited by concordats. In Protestant theology the term hierarchy is sometimes used to designate the sacred and divine rule of the Church established by Christ. The body of Protestant divines holds that Christ instituted no hierarchy in the ecclesiastical sense, but condemned it; that he endowed his Church with no civil power; and that the functions of its teachers and officers are purely moral and spiritual. From these views many of the writers of the Church of England dissent, rejecting the papal supremacy and what is involved in it, but holding in substantials the rest of the hierarchical views of the Church of Rome. The Lutheran Reformers (at Augsburg, 1530) rejected the whole theory of the hierarchy.

Hi'ero, d. 467 B.C.; Tyrannus of Syracuse, in Sicily; was victor at Olympia, 488 B.C.; succeeded Gelon, his brother, 478; conquered Naxos and Catana in Sicily; defeated the great fleet of the Etruscans, 474, and in the same year won a victory at the Pythian games. He was a generous patron of art and letters. In 472 and 468 he won his second and third victories in the Olympic games. Pindar celebrated these victories in his odes.

Hiero, abt. 307–216 B.C.; King of Syracuse; was a natural son of one Hierocles; served with distinction under Pyrrhus; became general of the Syracusans; sent a supply of corn to Rome, 272; routed the Mamertines at the river Longanus, and was declared king in 270 B.C.; waged a disadvantageous war with Rome, 264–63 B.C., after which he was a most faithful ally of that power. He was a popular ruler, and his reign as a whole was one of splendor and prosperity. There are many coins, inscriptions, and other existing remains of Hiero's time.

Hieroglyphics (hī-ėr-ō-glif'īks), a term originally applied to the inscriptions sculptured on buildings in Egypt, in the belief that the writing was confined to sacred subjects, and legible

only to the priests. The term has also been applied to picture writing in general, such as that of the Mexicans and the still ruder pictures of the N. American Indians. Three different modes of writing were used by the ancient Egyptians, the Hieroglyphic, the Hieratic, and the Demotic. Pure hieroglyphic writing is the earliest, and consists of figures of material objects from every sphere of nature and art, with certain mathematical and arbitrary symbols. Next was developed the hieratic, or priestly, writing, the form in which most Egyptian literature is written, and in which the symbols almost cease to be recognizable as figures of objects. Hieratic writings of the third millennium B.C. are extant. In the demotic, or enchorial, writing, derived directly from the hieratic, the symbols are still more obscured. The demotic was first used in the ninth century B.C., and was chiefly employed in social and commercial intercourse. Down to the end of the eighteenth century scholars failed to find a clew to the hieroglyphic writings.

HIEROGLYPHICS.

In 1799, however, M. Bouchard, a French captain of engineers, discovered at Rossetta the celebrated stone which afforded European scholars a key to the language and writing of the ancient Egyptians. It contained a trilingual inscription in hieroglyphics, demotic characters, and Greek, which turned out to be a decree of the priests in honor of Ptolemy V, issued in 195 B.C. The last paragraph of the Greek inscription stated that two translations, one in the sacred and the other in the popular Egyptian language, would be found adjacent to it. The discovery of an alphabet was the first task. The demotic part of the inscription was first examined by De Sacy and Akerblad, and the signification of a number of the symbols ascertained. The hieroglyphic part was next carefully examined and compared with the demotic and Greek. At last after much study Champollion and Dr. Thomas Young, independently of each other, discovered the method of reading the characters (1822), and thus provided a clew to the decipherment of the ancient Egyptian writing.

Hieroglyphic characters are either ideographic, *i.e.*, using well known objects as symbols of conceptions, or phonetic, *i.e.*, representing words by symbols standing for their sounds. The phonetic signs are again divided into alphabetical signs and syllabic signs. Many of the ideographic characters are simple enough; thus the figure of a man, a woman, a calf, indicate simply those objects. Others, however, are less simple, and convey their meaning figuratively or symbolically. Water was expressed by three zigzag lines, one above the other, to represent waves or ripples of running water, milk by a milk jar, oil by an oil jar, fishing by a pelican seizing a fish, *i.e.*, fishing; seeing and sight by an eye, and so on. The figure shows specimens of the three styles of Egyptian writing, in the order (reading downward) of hieroglyphic, hieratic, and demotic. The words represented are "the god" (Amon,) "man" (and mankind), "Pharaoh," and "day."

The total number of signs in the hieroglyphic writing cannot be given exactly, but the movable types cast under the auspices of the Royal Society of Berlin for the ready reproduction of Egyptian inscriptions are over 1,300 in number. The direction of the Egyptian writing was largely dependent upon convenience or artistic effect. It might run in either direction, horizontally, or vertically downward; all three directions are found in the same funereal stella. The successive groups of characters are found arranged in squares, each of which must be completely read before any in the following square. In papyrus rolls the ordinary direction was from right to left, but occasionally the scribe varied his practice, and wrote vertically. In all cases the writing was read from the side toward which the hieroglyphs faced.

Hieronymites (hī-ĕr-ŏn'ĭ-mīts), properly the hermits of St. Jerome. The name of four hermit bodies of Spaniards and Italians: (1) The body founded by Ferdinand Pecha out of those who were originally Franciscan Tertiaries of the Strict Observance. In 1373 the new order was accredited by Pope Gregory XI, and received an Augustinian rule. The monastery of Yuste, where Charles V passed his last days after his abdication, and that in the Escurial erected by Philip II belonged to this order, which was once very rich and extensive, but is now small and feeble. (2) A branch founded by the Spanish Lupus, 1424, but the monasteries in Spain, 1595, were by Philip II assimilated with those of (1); those in Italy maintained their independence. (3) Another small congregation, called Hieronymites, was founded at Pisa by one of the Gambacorti abt. 1390. It still exists. (4) The Hieronymites of Fiesole, founded 1360, dissolved by the pope, 1668.

Hieron'ymus. See JEROME.

Hieronymus of Car'dia (in Thrace). Greek historian and general; served with distinction under Eumenes, Antigonus, Demetrius, and Antigonus Gonatas; and wrote a history of the successors of Alexander extending to Pyrrhus, the invader of Italy.

Hierophant (hī-ĕr'ō-fănt), mystagogue, prophet or priest of Demeter who had charge of the Eleusinian Mysteries, and initiated new members into those mysteries. He had to be a descendant of the hero Eumolpus, unmarried,

and unblemished in character and in body. He preserved and expounded the unwritten law, and exhibited the sacred symbols to the initiates.

Hig'ginson, Francis, 1588–1630; American clergyman; b. England; was for a time a parish preacher at Claybrooke, Leicester, but, becoming a Puritan, had to retire; then supported himself by preparing young men for the university; accompanied the Massachusetts Bay Company's expedition to New England, 1628, and was appointed teacher of the congregation in Salem; published "New England's Plantation."

Higginson, Thomas Wentworth, 1823– ; American author; b. Cambridge, Mass.; was pastor of a Unitarian church at Newburyport, 1847–50, and of a "free religious" society at Worcester, 1852–58; was active in the anti-slavery agitation of that period; removed to Kansas, and was brigadier general of the forces which resisted the attempt to make it a slave state. On the outbreak of the Civil War, entered the service as captain; became, 1862, colonel of the first regiment of emancipated slaves, and captured Jacksonville, Fla.; having been wounded, was retired, 1864, and after living in Newport, R. I., returned to Cambridge; was appointed state military and naval historian, 1889; works include "Outdoor Papers," "Malbone, an Oldport Romance," "Army Life in a Black Regiment," "Life of Margaret Fuller Ossoli," "History of the United States," "Afternoon Landscape," poems, and a translation of the works of Epictetus.

High'er Crit'icism, scientific investigation of literary documents, to discover their origin, history, authenticity, and literary form. It is distinguished from *Lower Criticism*, which deals mainly with the text of the document, while the former judges it in its entirety. These terms are applied to the study of all ancient literature. The term is most familiarly employed in recent biblical studies. When thus applied it is an attempt to discover when the various books of the Bible originated; whether they were written by the authors to whom they are popularly assigned; of what materials they are composed; whether they are self-consistent, and to what extent they agree or disagree with one another; whether additions have been made to them from time to time; whether they are confirmed or discredited by the monuments and the history of the period in which they are supposed to have originated.

High'landers, properly the Gaels or Celtic inhabitants of the Highlands of Scotland. In the British army previous to 1881 the term designated the eight regiments of foot soldiers who wore the old Highland costume, each with its own distinctive tartan. These were the Forty-second, Seventy-first, Seventy-second, Seventy-fourth, Seventy-eighth, Seventy-ninth, Ninety-second, and Ninety-third regiments. The Ninety-first (Argyleshire regiment) was sometimes reckoned with the Highlanders. In 1881 a territorial reorganization of regiments took place, and the numerical designation of the foot regiments was dropped.

High'lands of the Hud'son, broken hills which stretch from SW. to NE. through Rockland, Orange, Putnam, and Dutchess counties, N. Y., being the NE. continuation of the Blue Ridge, extending farther NE. in the Taconic and Green mountains of W. New England. The passage of the Hudson through the Highlands is marked by fine scenery, and it is remarkable as almost the only instance in the U. S. of a navigable river passage through a great mountain range. The Highlands are mainly composed of azoic rocks, with rugged and steep sides and a somewhat scanty soil.

High Places, places frequently mentioned in the Old Testament as those where the people unlawfully went to worship strange gods. The custom of erecting shrines on hilltops is a very ancient and widespread one, and seems to have arisen from the belief that the tops of hills were nearer the abode of Deity. The high-place worship is forbidden in the Pentateuch, in the interest of worship at a single sanctuary for the whole nation; but it was prevalent at all periods, and, in certain circumstances, even such men as Samuel, David, and Elijah practiced it. In later times reforms occurred, and the more devout kings of Judah actively destroyed the high places.

High Priest, in the hierarchy of the Hebrews, the principal religious dignitary of the nation. By the Mosaic law the office was held for life, and was hereditary in the line of Eleazar, son of Aaron, the first high priest; but in the New Testament times the office had ceased to be hereditary, and was held at the will of the civil ruler. One of the most brilliant periods of this pontificate was that of the Asmonæan princes (Maccabees), some of whom joined regal to priestly authority.

High Seas, name given to the open ocean; the part of the ocean not in the territorial waters of any sovereignty. The generally accepted principle of international law is that the jurisdiction of maritime states extends only three miles from their own coasts. This extent of sea is called territorial sea; the remainder is known as high seas, and is accessible on equal terms to all nations. This distinction has little effect on the right of navigation, but does affect fishing. Estuaries and inland seas are, of course, excepted.

High'way. See ROAD and PAVEMENTS.

Hil'ary, d. 467; pope; b. Sardinia; succeeded Leo I, 461; was zealous for the faith and strict in discipline; claimed the preëminence of the See of Rome; inspired five of the canons passed by the Synod of 465, including an indorsement of the canons of Nice and one forbidding bishops to nominate their successors; succeeded by Simplicius; his day is February 21st.

Hilary, Saint, d. 367; "the Athanasius of the West;" b. Poitiers, Gaul, where he became bishop abt. 353; was banished to Phrygia, 356, because he would not sanction the condemnation of Athanasius; defended the doctrine of the Trinity in the Council of Se-

leucia, 359; denounced the Arian Emperor Constantius as an Antichrist; returned to Italy and Gaul, and labored to purge the Church of heresy; was one of the ablest men of his century; his day is January 14th.

Hilary, Saint, abt. 401–449; Bishop of Arles; b. Gaul; became bishop, 429; had a bitter controversy with Pope Leo the Great, because he refused to acknowledge the supremacy of Rome, which, however, was amicably settled; wrote "Metrum in Genesin," an account of the Creation, the Deluge, and the preservation of Noah.

Hil'da, Saint, 617–80; abbess of Streaneshalch (now Whitby), Yorkshire, England; was a grandniece of King Edwin of Northumbria; became abbess of Hartlepool, 650, and afterwards erected a monastery at Whitby, which her reputation for sanctity made the most flourishing in England; her day is November 18th.

Hil'debrand. See GREGORY VII.

Hildebrand, Hans Olof, 1842– ; Swedish archæologist; b. Stockholm; became state antiquarian and secretary of the Swedish Academy of Literature, 1879; a fertile writer on topics of Swedish history and prehistoric archæology, notably "The Swedish People during Pagan Times," "The Prehistoric Nations of Europe," "Life in Iceland during the Saga Time," "Mediæval Sweden," and "The Industrial Arts of Scandinavians in the Pagan Time."

Hildebrandt (hĭl'dĕ-brănt), **Eduard,** 1817–68; German painter; b. Dantzic; was Prof. in the Academy of Art at Berlin. His N. and S. American, European, and Oriental landscapes are remarkable for aërial effects. He also excelled in genre paintings.

Hildebrandt, Ferdinand Theodor, 1804–74; German painter; b. Stettin; was called the first colorist of the school of Düsseldorf, where he was professor for many years; excelled in historical, religious, and genre paintings, and especially in illustrating the plays of Shakespeare. Among his numerous portraits, those of old men are most admired.

Hil'degard, Saint, 1098–1180; German nun; b. Böckelheim, diocese of Mentz; was abbess of the Benedictine Convent of Disibodenberg, and afterwards of Rupertsberg on the Rhine, and had ecstatic visions; wrote books in German and in Latin; published a full account of her revelations in a work called "Scivias"; and addressed public assemblies in various cities. Her visions were examined by the Council of Treves, 1147, and their publication was authorized by Pope Eugenius III. Her day is September 17th, but she has never been solemnly canonized.

Hildesheim (hĭl'dĕs-hĭm), town of Germany; province of Hanover; on the Innerste, 25 m. SE. of Hanover; contains a cathedral, built 1015, with famous bronze gates and glass paintings; the Church of St. Godehard, built 1133, and the Church of St. Michael, built 1022; is a Roman Catholic bishop's see; chief manufactures, sugar, machinery, stoves, castings, and tobacco. Hildesheim became a member of the Hanseatic League, 1241, and remained a free town till 1803, when it was acquired by Prussia. Pop. (1900) 42,973.

Hil'dreth, Richard, 1807–65; American author and historian; b. Deerfield, Mass.; abandoned the practice of law in Boston, 1832, to become editor of the Boston *Atlas*; published his antislavery novel, "Archy Moore," 1837, an enlarged edition of which appeared, 1852, under the title of "The White Slave"; resided in Demerara, British Guiana, 1840–43, and, as the editor successively of two newspapers in Georgetown, the capital of the colony, earnestly advocated the system of free labor; was appointed consul at Trieste, 1861; died Florence, Italy; principal work, his "History of the United States," six volumes, 1849–56; also published a "History of Banks," "Theory of Morals," "Theory of Politics," and "Japan as it Was and Is," 1855.

Hill, Ambrose Powell, 1825–65; American military officer; b. Culpeper Co., Va.; graduated at West Point, 1847; in the Civil War he rose to be lieutenant general in the Confederate service; took an active part in the campaigns in N. Virginia and in the Peninsula, at Antietam, Fredericksburg, Chancellorsville, Gettysburg, and the Wilderness; and was killed by a rifle shot at the end of the siege of Petersburg.

Hill, Rowland (Viscount), 1772–1843; British general; b. Prees Hall, England; entered the army, 1790; served with the greatest distinction in most of the battles against Napoleon in which the British participated from Toulon to Waterloo; was raised to the peerage, 1814; took the chief command, 1828, and became a viscount, 1842; was called the "right arm of Wellington," and was the most popular general in the British army.

Hill, Sir Rowland, 1795–1879; English postal reformer; b. Kidderminster; was for several years a teacher of mathematics; aided in founding the colony of S. Australia; and, 1837, published a pamphlet on post-office reform. He succeeded in bringing the subject before Parliament, and in July, 1839, a bill to carry his plan into effect passed by a majority of 102; and on January 10, 1840, the uniform penny rate came into operation. A special office was created to enable him to carry the plan into effect, which he did with great success. He was, however, bitterly opposed and soon dismissed, but, 1846, was appointed joint secretary to the postmaster-general, and, 1854, sole secretary, retiring, 1864. In 1860 he was knighted and received a Parliamentary grant of £20,000.

Hil'la, Hil'lah, or Hel'lah, town of Asiatic Turkey, on both sides of the Euphrates, amid the ruins of Babylon; is supposed by some writers to have been the place where the Hebrew captives carried off from Jerusalem by Nebuchadnezzar were chiefly established.

Hil'lel (the ELDER), flourished in the latter half of the first century B.C.; rabbi and presi-

dent of the Sanhedrim of Jerusalem; is admired for his humanity, mildness, and love of peace, and celebrated as the reformer and great propagator of the study of the traditional law, the results of which were afterwards collected under the title of "Mishnah."

Hillel (the YOUNGER), flourished abt. the middle of the fourth century A.D.; descendant of the preceding; became president of the Sanhedrim, the head of the school of Tiberias, and the great reformer of the Jewish calendar.

Hil'ler, Ferdinand, 1811–85; German composer; b. Frankfort; became kapellmeister at Düsseldorf, 1847, and at Cologne, 1850; conducted the Rhine festivals in the latter city; compositions comprise oratorios, symphonies, trios, and quartets for stringed instruments, and a large number of songs and pianoforte pieces; oratories include "Saul" and "The Destruction of Jerusalem," symphonies "Spring Symphony in E."

Hil'ton Head, township in Beaufort Co., S. C.; on Hilton Head Island; has on the N. the Port Royal entrance, which constitutes a noble harbor. On the outbreak of the Civil War, Hilton Head was fortified by the Confederates, but was taken by the U. S. naval forces November 7, 1861.

Himalaya (hĭm-ä'lä-yă), "the abode of snow," highest and most majestic system of mountains on our globe, forms the boundary between the high table-land of Tibet on the N. and the low, alluvial plain of Hindustan, around the Ganges and Brahmaputra, on the S., and stretches in a curved line, 1,500 m. long, and at some points 350 m. broad, from Hindu Kush to Assam. To the S., toward the plain of the Ganges, Himalaya stands almost perpendicular, from 4,000 to 5,000 ft. high, like a wall, from which the mighty rivers formed by the melting of the snow burst forth with tremendous violence, splitting the granite masses and forming long, winding, but narrow chasms. To the N. the mountains slope more gently toward the plateau of Tibet. The Himalaya consists of several ranges, with a direction parallel to each other, and inclosing fertile and well-cultivated valleys, some of which are among the most beautiful places on earth; as, for instance, the valleys of Kashmir, Nepal, and Bhutan. The central range is the highest, averaging from 16,000 to 20,000 ft., and 45 peaks are known to rise above 23,000 ft. Mt. Everest, the highest mountain on our globe, is, according to Waugh, 29,002 ft. high; Kanchinjinga, 28,156; Dhawalagiri, 26,826; Nanda Devi, 25,749; and Shumalari, 23,929.

The line of perpetual snow descends to 16,200 ft. on the S. side of the range, but only to 17,400 ft. on the N.—a singularity which probably can be explained from the peculiarly dry atmosphere of the plateau of Tibet. Glaciers abound, and at some places they are known to descend from the regions of perpetual snow to about 12,000 ft. At an elevation of 2,000 ft. the heat varies from 100° to 37°; at 7,000 ft., from 80° to 26°; at 12,000 ft., the thermometer falls during the nights of September below zero. Wheat can be grown at an elevation of 13,000 ft., and up to the height of 5,000 ft. the vegetation still retains a tropical character; the tea plant has been introduced, and can be cultivated on the S. side up to a height of 5,000 ft., but it succeeds best at an elevation of 2,000 to 3,000 ft. The passes of the Himalaya are few and extremely difficult. Ibi-Gamin, leading into Gurhwal, is the highest known pass, 20,457 ft.; the highest pass used for traffic is Parany, 18,500 ft. above the sea. With respect to their geological structure, the Himalaya Mountains consist of granite and gneiss, which form the loftiest peaks, and against which strata of the Silurian period rest. Mines of gold, copper, iron, and lead exist, but are not worked with energy, and seem not to be of importance. The flora of the Himalaya is peculiarly rich and interesting.

Hi'mera, ancient city of Sicily; on the N. coast; was founded in the seventh century B.C. by a colony from Zancle, and was destroyed 408 B.C. by the Carthaginians under Hannibal.

Himilco (hĭ-mĭl'kō), flourished in the sixth or seventh century B.C.; Carthaginian navigator; was sent on a voyage of discovery N. from Gades (Cadiz) at the same time that Hanno was commissioned to explore and colonize the W. coast of Africa; is said to have made a discouraging report on his return.

Himilco, Carthaginian general who commanded, in conjunction with Hannibal the son of Gisco, the third expedition sent by the Carthaginians to Sicily (406 B.C.), and who succeeded him on his death; made two other expeditions to Sicily, in the last of which he advanced against Syracuse, but failed, and on his return committed suicide by starvation.

Himyarites (hĭm'yă-rĭts), "the red" race of S. Arabia and adjoining parts, who traced their origin to Himyar, grandson of Saba and descendant of Joktan or Kahtan, one of the mythical ancestors of the Arabs. According to their traditions, they became the dominant race in Yemen, about three thousand years before the time of Mohammed. Abulfeda assigns to their dynasty a duration of two thousand and twenty years. The date of the destruction of the first Adite or Cushite empire in S. Arabia has been fixed by Caussin de Perceval at abt. 1800 B.C. It is supposed that it was caused by the invasion of the Joktanite tribes; but the Cushites soon recovered the supremacy. During the first centuries of the second Adite empire Yemen was temporarily subjugated by the Egyptians. The Joktanites under Yarub gained the political supremacy, according to Caussin de Perceval, at the beginning of the eighth century B.C.

Abd Shems, Yarub's grandson, had several children, among them Himyar or Ghazahaj and Kahlan, from whom were descended the greater part of the Yemenite tribes at the time of the rise of Islamism. The children of Himyar at first shared the royalty with other families. Abt. 100 B.C. the supreme power was concentrated in the house of Himyar, and caused the ancient name of Sabæans, given to the S. Arabs, to be replaced by that of Himyarites. In the account of the expedition of

Ælius Gallus, 24 B.C., the Himyarites appear under the name of Homerites. The most flourishing period of the Himyarites appears to have begun with Harith er-Baish, whom Caussin de Perceval places abt. 100 B.C., and ended with Dhu Norvas and his successor, who were defeated by the Abyssinians, 525 A.D. S. Arabia subsequently fell under the dominion of the Persians, and, 629, the Himyarites succumbed to Mohammed and accepted Islam. Direct descendants of the ancient Himyarites are the tribes of Mahrah. They are black, medium in stature, Semitic in countenance, strong and sinewy. They belong to the orthodox sect of the Shafei.

Hincks, Edward, 1792–1866; Irish archæologist; b. Cork; took Anglican orders, and became rector of Ardtrea, and, 1826, of Killyleagh, Ireland. Though living in a remote country parish, and possessed of but small means, he became one of the first and ablest restorers of the lost knowledge of the meaning of the Assyrian inscriptions. He discovered the key to the Assyrian vowel system, and his papers "On Assyrian Verbs" contain the first successful attempts at an Assyrian grammar.

Hincks, Sir Francis, 1807–85; Canadian politician; b. Cork, Ireland; brother of the preceding; became a merchant, and, 1832, settled at Toronto, Canada, where he became a prominent editor and politician; Finance Minister of Upper Canada, 1841–43 and 1848–54; Prime Minister, 1851; Governor of the Windward Islands, 1855–62; of British Guiana, 1862–69; Finance Minister of Canada, 1869–73; knighted, 1869.

Hindoo Koosh (hĭn'dō kōsh). See HINDU KUSH.

Hin'duism, religious system prevalent among the Hindus, who form the bulk of the people of India. It is a comparatively modern development, through Brahmanism and Buddhism, influenced by non-Aryan notions, of the primitive nature worship of the earliest Aryan settlers, as exhibited in the collection of hymns called the "Vedas" (the oldest literary monuments of the country), and hence called "Vedism." These hymns have a strong mythic character about them. They are addressed to the elements and powers of nature personified —to fire, to the wind, to the firmament, the moon, and other objects. No one of the divinities has any recognized superiority over the others, but the differences in the numbers of the hymns addressed to the individual deities show that they were held in various degrees of dread and reverence. There are glimpses in some of the hymns of a high and spiritual conception of the Deity, or direct mystical allusions to one Superior Being, from whom all the rest emanate; and texts are found which speak more or less explicitly of "One Supreme Spirit, the Lord of the universe, whose work is the universe"; but the general character of the hymns does not rise above earthly objects. Protection from the elements, from sickness, and from enemies, aspirations for the favors of nature, for increase of children and of cattle, are their main topics. The difference between the religion of the Vedas and modern Hinduism is very wide—so wide, indeed, that the two religions have little or nothing in common beyond the Vedic texts and formulas still in use. The code of Mann, a pre-Christian production, recognizes Brahma, the creative energy of the world, states the doctrine of transmigration and of future reward and punishment, and develops the caste system.

It is in the Puranas that Hinduism receives its full development. Brahma the Creator, Vishnu the Preserver, and Siva the Destroyer (or rather Regenerator) are acknowledged as the three great divinities constituting the Triad. Vishnu the Preserver was then, as now, the most popular deity, under one or other of his ten *avatárs* or descents, or, as the word is sometimes translated, "incarnations." The religion of the Hindus is principally directed to the worship of three leading divinities, Vishnu, Siva, and Devi—each of whom has many names and forms. The worship of Vishnu is cheerful and sensuous; of Siva, somber and severe; of Devi, terrible and disgusting. Besides these great divinities there are many others of less dignity and power, who have their special attributes and spheres of action. They are not the objects of any regular worship, but they are invoked and adoration is offered to them when it is desired to propitiate them and secure a favorable exercise of their powers. There are Indra, the god of the firmament and heaven; Surya, the sun; Soma, the moon; Varuna, the waters; Pavana, the wind; Agni, fire; Kuvera, wealth; Karttikeya, war; Kama, love; Yama, the god of the infernal regions and judge of the dead; Ganesa or Ganapati, the god of wisdom and the remover of obstacles, is represented as a short fat man with an elephant's head. His image is frequently found at the entrance of temples, and he is invoked at the beginning of important works and ceremonies. The total number of gods is said to be 330,000,000.

The Hindu religion ascribes remarkable virtues to sacrifice and faith. Austere penance, perseveringly and rigidly performed, makes even the gods subservient to the wishes of the devotee, and that quite irrespective of the object in view, so that the most impious and worthless may gain their ends by sacrifice and severe bodily torture.

Hin'du Kush, mountain range in central Asia, extending from lon. 68° to lon. 75° E., and forming the boundary between Afghanistan and Turkestan. At its E. extremity it is connected with the Karakorum Mountains, which it resembles in many of its features, though it is lower. The dividing line between the Hindu Kush and the Himalaya forms the Baroghil Pass, which leads from the high valley of Little Pamir down into the valley of Kashgar. At its W. extremity it is separated from Koh-i-Baba by the Hajjigak Pass, which leads from Kabul to Turkestan. Its entire length is 365 m.; highest point, probably Tirich-Mir, about 23,000 ft. high.

Hindustan (hĭn-dō-stăn'). See INDIA.

Hin'ny, or **Jen'net,** hybrid between the horse and the she ass, a very different animal from

the mule, which is bred between the ass and the mare. The hinny neighs like a horse, the mule brays like the ass. The mule's ears, tail, and general aspect are asinine. The hinny more nearly resembles the horse; is of slighter build, and of strength inferior to that of the mule. It is bred to some extent in Spain and Barbary.

Hins'dale, Burke Aaron, 1837–1900; American educator; b. Wadsworth, Ohio; entered the ministry of the Christian Church, 1861; pastor in Solon, Ohio, 1864–66; Cleveland, 1866–68; assistant editor of *The Christian Standard*, 1866–69; Prof. of History and English Literature in Hiram College, 1869–70; became its president and Prof. of Philosophy, History, and Biblical Literature, 1870; Prof. of the Science and Art of Teaching in the Univ. of Michigan after 1888; author of "Genuineness and Authenticity of the Gospel," "The Jewish Christian Church," "Republican Text-book," 1880; "Garfield and Education," "The Old Northwest"; edited "The Life and Works of James A. Garfield."

Hiogo (hē-ō'gō), seaport of Japan, island of Hondo, on the W. shore of the Bay of Osaka, about 40 m. SW. of Kioto, with which it is connected by railway. The place was opened to foreign commerce, 1860, and has since developed rapidly. Its harbor is one of the best in the country, and is annually visited by upward of 1,000 vessels. Tea, silk, copper, camphor, wax, tobacco, ginseng, isinglass, and dried fish are exported; woolen and cotton goods, hardware, tools, and machines are imported. The trade with Kioto and the interior of the country is also considerable. Hiogo was, 1336, the scene of a famous battle, in which the heroic Kusunoki Masashige fell fighting in support of the rightful emperor. It now forms one community with Kobe. Pop., with Kobe (1904) 285,002.

Hip'-joint Disease', technically known as COXALGIA, an inflammation of the hip-joint, sometimes very rapid, more often slow and insidious, which may begin either in the head of the thigh bone or the socket of the hip bone, or else in the membrane (*synovial*) that lines its cavity, but which finally extends to all its tissues, cartilages, ligaments, and surrounding soft parts. Inflammation of the bones (*osteitis*), by far the most common origin of the disease in children, is favored by the incomplete ossification and active nutrition of the bones in childhood. The first symptom is lameness, followed by pain, first felt in the knee, afterwards excited in the joint itself by direct pressure, by motion of the limb, or by the weight of the body resting upon it. It soon becomes impossible to move the head of the thigh bone in its socket; the whole hip moves with every motion communicated to the leg. This sign is most characteristic of the confirmed disease; it is due at first to the spasmodic rigidity of muscles—later to inflammatory adhesions.

In the second stage the amount of serous fluid in the joint cavity is increased, the thigh is more strongly bent on the body (flexed), and drawn inward (adducted) so that the foot crosses the opposite leg. The pain becomes severe; standing and walking are difficult. In the third stage the cavity fills with matter or "pus," the ligaments of the joint are relaxed, abscesses form in the neighborhood, and all the soft parts are swollen by inflammatory exudations. The patient's strength is severely undermined, hectic fever sets in, the emaciation is extreme, and death may occur gradually from exhaustion, or more rapidly from acute absorption of poisons produced by pus.

Hipparchus (hip-pär'kŭs), flourished in the middle of the second century B.C.; generally considered the founder of the science of astronomy; b. Nicæa, Bithynia. Of his life nothing is known, and of his writings only the least important, "A Commentary on Aratus," has been left; but from the "Syntaxis" of Ptolemy we know that by his great discoveries, and more especially by his method, he actually laid the foundation of the science of astronomy.

Hip'pias. See HARMODIUS.

Hip'po, or Hippo Re'gius, ancient city of Numidia, the ruins of which are still to be seen near Bona, Algeria; was one of the residences of the Numidian kings; and afterwards celebrated as the episcopal see of St. Augustine. Its surname served to distinguish it from another town of the same name on the Carthaginian coast, W. of Utica.

Hippocam'pus, in Greek mythology, a sea monster half horse and half fish; also a singular genus of fishes of the family *Hippocampidæ*. They have ganoid scales, and swim generally in a vertical posture. The males carry the

HIPPOCAMPUS.

spawn in pouches on the tail until the fry are hatched. The tail is prehensile, the caudal and ventral fin absent. All the species are small. *H. Hudsonius* is found along the Atlantic coast of the U. S. From the peculiar shape of the head it is called the sea horse.

Hippocrates (hip-pŏk'rä-tēz), abt. 460–357 B.C.; Greek physician, called the "father of medicine"; b. Cos; belonged to the order of Asclepiadæ, or descendants of Æsculapius; studied at Athens; practiced his profession in his native island of Cos, and passed the close of his life in Thessaly. Hippocrates raised medicine from a system of superstitious rites practiced wholly by the priests to the dignity of a learned profession. He referred diseases to two leading causes, climate and diet, and taught that there were four humors in the human body, blood, phlegm, yellow bile, and black bile, an undue preponderance of any of

which was a proximate cause of sickness. He practiced bleeding, cupping, cauterization, and auscultation, and used several mineral and vegetable remedies, including purgatives. Of the seventy-two books which bear the name of Hippocrates, only five or six can be attributed with much probability to him.

Hippocrene (hĭp'pō-krēn), fountain on the side of Mt. Helicon, in Bœotia, believed by the ancients to be a favorite haunt of the Muses and a source of poetic inspiration; was fabled to have been produced by a stroke of the foot of Pegasus; is still a fine spring.

Hippodamia (hĭp-ō-dā-mĭ'ä), in Greek legend, daughter of Œnomaus, King of Elis, and Asterope, one of the Pleiades. Her father obliged each one of her suitors to contend with him in a chariot race, gave him the start, and then, in passing, transfixed him with a spear. Sixteen perished in this manner; Pelops, son of Tantalus, King of Phrygia, won her by bribing the charioteer of Œnomaus, who by inserting a linch pin of wax, caused the latter to be dragged to death by his own horses. Hippodamia became the mother of Atreus and Thyestes; induced them to kill Chrysippus, the illegitimate son of Pelops by another woman; was banished with her children. She died in Midea, Argolis, but Pelops brought back her bones to Elis and erected a monument in her honor.

Hip'podrome, name anciently given in Greece and Constantinople to the ground where chariot and other horse races took place. Of these races, those in chariots were the most popular. In these races many competitors for the prize entered the race, which was consequently attended with much danger to the drivers—a danger much increased by the limited size of the hippodrome and the consequent necessity of frequent turning of goals. The hippodrome at Olympia was long the most famous, but in later times that at Constantinople acquired renown, and the whole Byzantine populace was divided in their social and political relations by factions which took their origin in the hippodrome.

Hippolyte (ē-pō-lēt'), **Louis Mondestin Florvil,** 1827–96; Haitian revolutionist; b. Cape Haitien; was educated for a military career in France, and on his return to Haiti entered the army, distinguishing himself in the defense of Bellair, 1865; headed the insurrection which overthrew Pres. Légitime, 1889, and succeeded to the presidency; was a stern and cruel ruler, executing many of his political enemies.

Hippolytus (hĭp-pŏl'ĭ-tŭs), in Greek mythology, was a son of Theseus. His stepmother, Phædra, fell in love with him, and accused him to his father in order to revenge herself for his coldness. Theseus then cursed his son, and asked Poseidon to destroy him, but after the death of Hippolytus the king learned the innocence of his son and fell into great grief; Phædra killed herself. According to the Roman mythology, Hippolytus was restored to life by Æsculapius, and placed in a grove at Aricia by Diana, where he received divine worship under the name of Virbius.

Hippolytus, Saint, ecclesiastical writer of the third century. Although his writings had been always numbered among those of the ante-Nicene fathers, his personal history was surrounded with uncertainty until the middle of the nineteenth century. The discovery, 1551, at Rome of a statue of a bishop bearing the inscription "*Hippolytus Episcopus Portuensis,*" and a list of his works, taken with the discovery at Mt. Athos, 1842, of a Greek manuscript, enabled Bunsen in his "Hippolytus and His Times" (4 vols., London, 1851), and in a second enlarged edition of the same work, under the title "Christianity and Mankind" (7 vols., 1854), to give unity to the traditions and explain the contradictions respecting him. It is thus established that he was bishop of the *Portus Romanus* or *Romæ*, the new harbor of Rome, founded by Trajan opposite Ostia. In 235 he was by the order of Maximin banished to Sardinia, but, 236, was permitted to return; and not long after was put to death, as the tradition quoted by Prudentius says, by being torn to pieces by wild horses. His day is August 21st.

Hippo'nax, Greek satirical poet of the sixth century B.C., of whom about 100 lines are still extant. He was banished from his native city, Ephesus, on account of his satires, and lived afterwards at Clazomenæ. Ugly, scrawny, misshapen, he was a fine subject for the chisels of Bupaulis and Athenis, and in revenge for their caricatures Hipponax lampooned the two sculptors so severely that they are said to have hanged themselves. He was a hard hitter and merciless foe of everything except freedom, a hopeless vulgarian, and hence a curiosity in Greek literature.

Hippophagy (hĭp-pŏf'ä-jĭ), eating of horseflesh. From the earliest times the N. races of Europe ate the flesh of the horse, and, in consequence of religious associations, sacrificed it to their gods. Owing to this, early Christian missionaries made the abstinence from horseflesh a test of religion. In the eighth century the popes anathematized it, and Gregory III declared *immundum est et execrabile*—"it is foul and vile." In the Njall saga a converted Icelander, taunting an enemy, tells him that he has but lately eaten horseflesh. In time it was popularly believed that horseflesh was unwholesome. The French were the first to doubt this, and in the retreat from Moscow Larrey killed his horses to make broth for the sick. According to experiments and reports made by Baron Guerrier de Dumost, horseflesh contains one seventh more nutriment than its equivalent weight of beef.

In 1842 Dr. Perner, of Munich, began to combat the prejudice against horseflesh, and, 1845, the sale of it was legalized in Bavaria. At the same time hippophagic societies were formed in Paris and Berlin. Since 1855 horse butcheries have been established throughout Germany. In Paris the first were opened, 1865, in the quarters of St.-Marceaux and Popincourt; but it was not until the privations of the siege of 1870–71 had taught all Paris by experience the real excellence of horseflesh that it became popular, and from that time the sale

has increased rapidly. Horseflesh has a pleasant taste, and expert cooks in Paris excel in dressing it so as to make it resemble venison. The meat is dark in color, but, taking it of relative ages and feeding, it is better than beef under the same conditions. Since 1889 the law in Great Britain requires that all horseflesh exposed for sale shall be plainly labeled.

Hippopot'amus, common as well as generic name of a large, even-toed mammal (*Hippopotamus amphibius*) once inhabiting most of the rivers and lakes of Africa from the Nile to the Cape of Good Hope, and occasionally known to visit the salt water. In many localities it has become rare or even exterminated. It is one of the largest of existing quadrupeds, the bulk of its body being only little inferior

HIPPOPOTAMUS.

to that of the elephant. The largest males sometimes are 10 or even 12 ft. long. This animal is only 5 ft. high, and, its legs being short, its belly almost touches the ground. The color is reddish brown, and the body is covered with a dark, oily exudation. It is usually inoffensive and quiet, but has been reported as occasionally attacking beasts, and even men, with unaccountable fury. It is hunted for its flesh, which somewhat resembles pork, and for its skin, which is tanned and makes leather sometimes an inch thick, used as a material for buffing wheels and heavy belts, and for other mechanical purposes. Its teeth also furnish much of the best ivory, used in making instruments, etc. Its fat, of which a thick layer is found immediately under the skin, is salted and eaten under the name of lake-cow bacon.

Hi'ram, called also HIROM and HURAM, King of Tyre, contemporaneous with David and Solomon, and the ally of both. He sent a supply of cedar timber, with skilled craftsmen, to assist David in constructing his palace, and in Solomon's reign supplied timber, treasure, and men for the temple of Jerusalem. He is likewise spoken of as having been himself a great builder at Tyre, and is said to have reigned thirty-four years; he had a treaty of peace and commerce with Solomon, and was son and successor of Abibal.

Hir'-Hor. See HER-HOR.

Hirn, Gustave Adolphe, 1815–90; French engineer; b. Logelbach, Alsace; made his first investigations in the dyeing room of his father's cotton mill, and afterwards took charge of the mechanical department of the establishment. In 1845 he published his first essay "On the Mathematical Theory of Fan-blowers," and, 1854, his well-known "Interpretation of the Phenomena Caused in a Steam Engine by the Pressure of the Jacket." His study of the steam engine for the first time revealed to the engineering world the extent of the wastes of the modern engine.

Hiroshima (hē-rō-shē'mä), city of Japan in district of the same name; on the S. coast of the island of Hondo; is connected by railway with Kobe and Shimonosekê; has a large trade in bronze and lacquer work; nearby, on an island, is the Imperial Naval College, removed hither from Tokyo, 1890. Pop. (1903) 121,196.

Hirpini (hĕr-pī'nī), ancient people of Italy of Samnite race, inhabiting the central group of the Apennines between Lucania, Apulia, and Campania, and deriving their name from *hirpus*, the Samnite name of a wolf. They were subjugated by the Romans (probably together with the other Samnite tribes) before 268 B.C., at which time the Roman colony of Beneventum, which formed the strategical key to their country, was established. Immediately after the battle of Cannæ (216 B.C.) they declared in favor of Hannibal, but when he (209 B.C.) was driven toward the S. part of Italy, they bought peace on good terms from the Romans by betraying the Carthaginian garrisons in their cities. In the Social war (90 B.C.) they were among the first who took up arms against Rome, but they were soon reduced by Sulla, and after the end of the war their name as an independent nation is not mentioned.

Hirsch, Maurice (Baron), 1831–96; German financier and philanthropist; b. Bavaria, of Jewish parentage (his father, a wealthy merchant, was ennobled, 1869), accumulated a great fortune in the banking house of Bischoffsheim & Goldsmid, and in various enterprises, such as building railways in Hungary. His gifts to the cause of education were very large. He endowed the schools in Galicia with $2,000,000; offered to give $10,000,000 to Russian schools if no distinction of race or religion were made therein; 1891 spent about $15,000,000 in charity; and, 1892, gave $2,500,000 for the benefit of Russian Jewish emigrants to the U. S.

Hirtius (hĕr'shī-ŭs), **Aulus,** abt. 90–43 B.C.; Roman statesman; was a friend of Julius Cæsar, under whom he served as legate in Gaul (58). In 44 he received Belgic Gaul as his province, but governed it through a deputy, and was consul, 43. He was sent with an army to relieve Decius Brutus, then besieged by Antony in Mutina (Modena), and fell while leading his victorious troops to an assault.

Hispa'nia. See SPAIN.

Hispanio'la. See HAITI; SANTO DOMINGO.

Hissar', name of a division, district, and town in the Punjab, British India; a region long known in history, and only explored since 1875; has manufactures of textiles and other articles. Division contains districts of Hissar, Rohtak, and Sirsa; district forms the E. portion of the Bikanir desert; town and capital is on a railway and the W. Jumna Canal, 100 m. WNW. of Delhi. The town has manufactures of textiles and articles of steel. Pop. (1908) 10,000.

Histiæa (hĭs-tĭ-ē'ä), one of the oldest and most important towns of Eubœa; became subject to Athens during the Persian wars, but revolted, 445 B.C. As a punishment the Athenians removed all the inhabitants, replaced them with Attic colonists, and changed the name of the place to Oreus.

Histiæ'us, Tyrant of Miletus, under the suzerainty of Persia; won the attachment of Darius by guarding the bridge of boats over which the Persian army crossed the Danube on its expedition into Scythia, 513 B.C.—a service by which he saved the army and the life of the Persian king. His ambitious character, however, excited suspicion, and he was detained at the Persian court for thirteen years. He afterwards raised his Greek countrymen in Ionia against Persia, but Darius had still so much confidence in him as to send him to put down the rebellion. The rebellion itself failed utterly, and the treachery of Histiæus was discovered by Artaphernes, the Persian satrap of Sardis. He now fled from place to place, stirring the different Greek colonies in Asia Minor into premature insurrections; but at last was captured and put to death by Artaphernes, who sent his head to the Persian king. Darius, however, mourned deeply, buried the head with honors, and blamed Artaphernes for having acted hastily.

Histol'ogy, science which describes the anatomical elements and tissues of the body, according to their form and organization. When two or more kinds of anatomical elements are mingled and interwoven in a determined manner, they form a tissue, just as woolen or cotton threads interwoven with each other form a web or textile fabric. It is very rare that a tissue consists of but a single anatomical element. The tissue of the crystalline lens of the eye, containing only flattened fibers with finely toothed edges, and that of cartilage, containing only cartilage cells with an intervening hyaline substance, and certain epithelial tissues, are perhaps the sole examples of this in man and the higher animals. Generally speaking, a tissue consists of several anatomical elements, one of which is peculiar to it, the other perhaps common to several tissues. Thus the liver contains a peculiar anatomical element, the glandular liver cells; but these are arranged in definite groups, forming the lobules or acini, with the intralobular capillary blood vessels, the commencement of the hepatic ducts, and the terminal filaments of the hepatic plexus of the sympathetic nerve. The various tissues—NERVE, MUSCLE, CONNECTIVE TISSUE, etc.—are separately treated. See also CELL.

Histor'ical Theol'ogy. See CHURCH HISTORY.

His'tory, in its most ordinary sense, a narrative of transactions in the order of time, with or without commentary. In its origin, history, as a method of recording events, is indistinguishable from oral tradition, which seldom preserves the memory of any but the most remarkable occurrences beyond three or four generations. A considerable advance was made when traditions assumed the form of ballads, easily remembered and repeated, but no really authentic record could exist previous to the invention of writing. The first application of this art was to monumental purposes, and along with the invocation of deities, chronicles of the actions of kings began to figure on Egyptian and Babylonian temples. The invention of papyrus as a writing material was a further step in advance, and from this period (possibly abt. 4000 B.C.) the Egyptians possessed an historical literature. The practice of recording events in writing spread to the Hebrews, the Phœnicians, the Chaldeans, and the Assyrians, but the pursuit of history as a branch of literary art, and the study of it as a department of intellectual culture, were reserved for the Greeks.

About the middle of the fifth century B.C. Herodotus of Halicarnassus composed the first work answering to our present idea of history, presenting in a thoroughly artistic form the results of his own inquiries into a series of previous transactions. A great step in advance was taken by the next great historian, Thucydides, who, not content with relating the actions of men, endeavors to penetrate into their motives, and to investigate not merely the accompanying incidents, but the determining causes of changes in human affairs. The next distinguished philosophical historian, Polybius, though living in the age when all other states were succumbing to the power of Rome, was enabled to investigate the causes of national greatness and decay on a much larger scale than his predecessor. Xenophon's "Anabasis" and Cæsar's "Commentaries" are remarkable examples of pure narrative unaccompanied by reflection. Of the two great Roman historians, Livy, like Herodotus, aims principally at narrative, but aims at another purpose alien to the simplicity of his model—the glorification of his own people, whose prose epic, in fact, he has written. He also follows the example of Thucydides in interspersing his own reflections, frequently in the form of speeches composed by himself, but placed in the mouths of historical personages. Tacitus imitates Thucydides, but with the addition of an element distinctively his own—an intense moral purpose. Many valuable historians flourished during the decline of the Roman Empire, but we meet with none of special mark before Eusebius, A.D. 330, the first great ecclesiastical historian, and Procopius, A.D. 550, neither philosophical nor eloquent, but the model of the dry, impartial, businesslike historian.

During the Middle Ages history was entirely

eclipsed, except among the Saracens. Ignorance, superstition, the slow circulation of intelligence, the barbarism of language, and the total loss of the critical spirit conspired to reduce historians for several centuries to mere annalists. The intellectual revival of the twelfth century produced a marked improvement, but History was not replaced on her old footing until the resurrection of classical literature had brought good models to light, and the invention of printing rendered them accessible. Two great Italian historians, Machiavelli and Guicciardini, traced, the former the mediæval, the latter the contemporary, history of his country, with a mastery that fixed the standard of historical composition for the language. Their example, though not their style, was emulated by de Thou, the French, and Davila, the Italian, historian of the wars of religion in France; by Mariana, the historian of Spain, and Strada, the elegant but inaccurate narrator of the revolt of the Low Countries; Raleigh, the first Englishman to attempt a history of the world; and Clarendon, whose account of the Rebellion is perhaps the best example of a partisan history. These remain the only eminent English historians until Hume, the magic of whose style and the symmetry of whose narrative atone in some degree for his negligence and prejudice. Robertson gave the first example of a high-class English historian devoting himself to the transactions of foreign nations. A far greater name is that of his contemporary, Gibbon, whose "Decline and Fall of the Roman Empire" is perhaps the greatest historical work ever produced.

The subordinate historical branch of memoir writing has flourished more among the French than among any other nation. In virtue of its subject, Carlyle's "French Revolution" may be included among French histories. This extraordinary work, a poem rather than a narrative, is the only modern book that has added an entirely new type to history. The reconstruction of philology and archæology has directed attention to classical history, which, with the exception of the era comprehended in Gibbon's work, may be said to have been completely rewritten during the nineteenth century. An important class of history, much cultivated in modern times, may be described as collateral or auxiliary to history proper. Its office is to treat of the origin and progress of human pursuits or institutions, such as commerce or law, which involves a chronological arrangement, though the mention of persons or events is only subsidiary to the main design. The Germans and the French have excelled in this kind of history. Hallam's "Constitutional History" is a good example in English.

The spirit of modern times has modified the study of history in four principal ways: (1) By the resort, as a main source of information, to archives, including statutes, charters, public documents of all kinds, diplomatic and even private correspondence. (2) By the endeavor to reconstruct the private as well as the public life of nations, involving an intimate knowledge of the minutiæ of their daily existence. (3) By the application of the mythical theory to fabulous, sometimes even to extraordinary, narratives. (4) By the attempt to frame a philosophy of history—*i.e.*, to discover the general laws on which particular events depend. Such works as Green's "History of the English People" exemplify the present tendency of histories—to trace the social character and national growth, rather than to record the details of battles or the exploits of kings. As there is no study more delightful than that of history, so is there none more vitally necessary to the citizen of a free state. The constitution of a democratic republic especially, assuming as an indispensable condition of its working that every citizen shall take an intelligent interest in public affairs, imposes the study of history as a duty incumbent on all. It is impossible to form a correct judgment of present circumstances without the means of comparison with the past supplied by a knowledge of history. The student must bear in mind, however, that all such knowledge is not equally useful. The annals of great military monarchies supply comparatively little that the citizen of a free state can turn to account, and some of the most attractive chapters of human history—that of Egypt, for instance—are chiefly important to the cultivation of special studies. The citizen of the U. S. should especially familiarize himself with the history of free states, his own country before all others; then the great and free country from which it sprang, and from whose institutions its own are derived; then the prototypes of freedom in ancient Greece and Rome. If possible, he should also familiarize himself with the slow development of Roman institutions into the feudalism of the Middle Ages, and the continuous transformation undergone by the latter.

Hitch'cock, Edward, 1793–1864; American geologist; b. Deerfield, Mass.; Prof. of Chemistry and Natural History in Amherst College, 1825–44; appointed state geologist of Massachusetts, 1830; president of Amherst and Prof. of Natural Theology and Geology, 1844–54; created the Hitchcock Ichnological Museum of Amherst College; published "Geology of the Connecticut Valley"; reports on the geology of Massachusetts, "The Religion of Geology, and its Connected Sciences," "Fossil Footprints in the United States," etc.

Hitchcock, Ethan Allen, 1798–1870; U. S. military officer; b. Vergennes, Vt.; graduated at West Point, 1817; served chiefly on garrison and recruiting duty in the Florida War, 1836. He was placed in charge of the Indian Bureau, 1841; during the Mexican War was inspector general of Gen. Scott's army; breveted brigadier general; commanded the military division of the Pacific, 1851–54; resigned from the army, 1855, and made his home in St. Louis; reëntered the army, 1862; was appointed major general of volunteers, and placed on duty in the War Department; served as commissioner for exchange of prisoners of war and commissary general of prisoners until 1867. Author of "Remarks upon Alchemy and the Alchemists," "Swedenborg a Hermetic Philosopher," "Notes on the Vita Nuova of Dante," etc.

Hittites (hit'its), a Canaanitish nation whose original seat was Hebron. They were a

commercial race, are frequently mentioned on the Egyptian monuments, as well as in the Bible, and were often noticed in the cuneiform inscriptions. After the conquest of Palestine they established a kingdom in the Orontes valley, their capital being Kadesh. Numbers of them remained with the Jews even as late as the time of Ezra and Nehemiah. Little is known of their religion. The Egyptian records contain the names of several of the Hittite kings.

Hit'torff, Jacques Ignace, 1793–1867; French architect; b. Cologne; settled in Paris; designed the Grand Circus, the Panorama, the Hôtel du Louvre, and different embellishments of the Place de la Concorde and Bois de Boulogne; author of "Polychromatic Architecture of the Greeks," "Ancient Architecture of Sicily," etc.

Hives. See NETTLE RASH.

Hivites (hī'vīts), Canaanitish race conquered by the Hebrews; part of them escaped total destruction by a successful fraud. The great mass of them, living in the region of Tyre, seem to have been unconquered. Solomon exacted tribute of the Hivites living in his kingdom.

Hoangho'. See YELLOW RIVER.

Ho'bart, Garret Augustus, 1844–99; American lawyer; b. Long Branch, N. J.; admitted to the bar at Paterson, N. J., 1866; became city counsel, 1871, and counsel to the Board of Freeholders in the following year; was in the legislature, 1873–74; was sent to the state senate, 1877, and was its president, 1881–82; defeated for the U. S. Senate, 1884; elected Vice President of the U. S., 1896.

Hobart, capital of Tasmania; on the Derwent River, which at its entrance into Storm Bay forms an excellent harbor for the largest vessels; is the see of an Anglican bishop and a Roman Catholic archbishop; has a handsome cluster of public buildings; is connected by rail with Launceston on the N. side of the island and by steamer with Melbourne; and has breweries, tanneries, flour mills, woolen mill, etc. The city was founded 1804, and was originally known as Hobart Town. Pop. (1901) 24,655.

Hob'bema, Meyndert, 1638–1709; Dutch landscape painter. Little is known of his life, but that he lived and died poor. He is ranked by many as dividing the supremacy of the great Dutch school of landscape, with Ruisdael and Cuyp; works include "The Avenue of Middelharnis," "Watermills and Bleacheries," "Ruins of Brederode Castle."

Hobbes (hŏbz), **Thomas,** 1588–1679; English philosopher; b. Malmesbury; lived in Paris, 1630–37, 1640–51; was tutor to Charles, Prince of Wales; published a treatise on civil government, 1642; "Treatise on Human Nature" and "Concerning the Body Politic," 1650; "Leviathan, or the Matter, Power, and Form of a Commonwealth, Ecclesiastical and Civil," 1651; by these offended the exiled English royalists and the French authorities, and fled to England; published a remarkable "Letter upon Liberty and Necessity," 1654, and the first and second divisions of his great work, "Philosophical Rudiments," 1655–58. His "Leviathan" and the treatise on civil government ("Elementa Philosophica de Cive") were censured in Parliament, 1666. After the Restoration Hobbes was pensioned by Charles II. He published, 1675, a translation of the "Iliad" and "Odyssey"; also wrote "Behemoth" (a dialogue on the civil wars), etc.

Hob'house, John Cam (Lord Broughton), 1786–1869; British statesman; was elected to Parliament by the Liberals of Westminster, 1820, and later represented both Nottingham and Warwick; entered the cabinet of Earl Grey as Secretary of War, 1831; was made Secretary of State for Ireland, 1833, and president of the Board of Control, 1835–41, 1846–52; created baron, 1851. His "Journey through Albania and other Provinces of Turkey with Lord Byron," "Illustrations of the Fourth Canto of Childe Harold," and "Italy," attracted much attention.

Ho'boken, city in Hudson Co., N. J.; on the Hudson River, opposite New York City, with which it is connected by several lines of steam ferries and a tunnel; is an important railroad terminus; has a large trade with the principal domestic and foreign ports; supplies New York City and its shipping with the greater part of their coal; has large dry docks; and is the terminus of the Holland-American, Hamburg-American, North German Lloyd, Wilson, Phenix, Savannah, and Thingvalla steamship lines. The piers of the North German Lloyd are the finest in the world. It is widely known for its production of lead pencils, caskets, leather, leather goods, wall paper, automobiles, artists' materials, straw hats, and foundry and machine-shop products. There are the Stevens Institute of Technology, Stevens Preparatory School, Hoboken Academy, Academy of the Sacred Heart, St. Mary's Hospital, and more than a dozen U. S. bonded and free warehouses. Pop. (1905) 65,468.

Hob'son, Richmond Pearson, 1870– ; U. S. naval officer; b. Greensboro, Ala.; graduated at Annapolis, 1889; subsequently was instructor in naval construction there; was on Admiral Sampson's staff during the war with Spain, with rank of lieutenant; led a party of volunteers which sank the collier *Merrimac* in the entrance to Santiago Bay, hoping to prevent the escape of the Spanish fleet; was captured and held a prisoner for a few months; was on duty in the Far East, 1899–1900; resigned from the navy, 1903; elected Democratic member of Congress, 1906; author of "The Sinking of the *Merrimac*"; "America Must Be Mistress of the Seas," etc.

Hobson's Choice, nominal choice with no real alternative; familiar term which owes its origin to the practice of Tobias Hobson, university carrier at Cambridge, England, in Milton's time. He was the subject of two poems by Milton. It is related in *The Spectator* (509) that Hobson was the first person in England who kept a hackney stable. He always politely asked his customers to take their

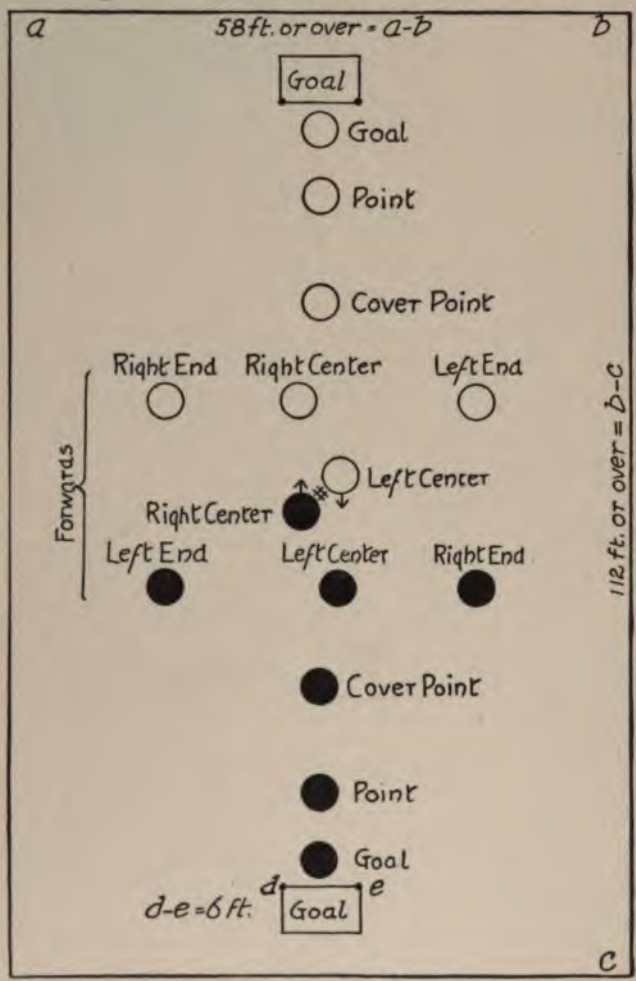
choice of his forty horses; but no matter which horse was chosen, Hobson always managed to put off the traveler with the horse which stood nearest the door.

Hochkirch (hōch'kĭrkh), village of Saxony; 7 m. SE. of Bautzen. Here Frederick the Great was completely defeated by the Austrians under Daun, October 14, 1758.

Höchst (hökhst), town in the province of Hesse-Nassau, Prussia; at the influx of the Nidda into the Main; 6 m. W. of Frankfort; is noted for the battles fought here, June 20, 1622, in which Tilly defeated Duke Christian of Brunswick, and October 11, 1795, in which the Austrians defeated the French under Jourdan. Pop. (1900) abt. 15,000.

Hochstädt (hōkh'stĕt). See BLENHEIM.

Hock'ey, game of ball called shinty in Scotland and hurley in Ireland, played on a field 100 by 50 yds., by two teams of eleven players each who are arranged as goal keeper, two backs, three half backs, five forwards. It is played with a club curved at the end, and the object of each side is to drive the ball, started on the center line, between the goal posts at the end of the opponents' field, the game being won by the side which has, within a given time, scored the majority of goals.



POSITIONS FOR HOCKEY.

Hock'ing Riv'er, stream of Ohio; rises in Fairfield Co., flows SE. through Hocking Co., and joins the Ohio in Athens Co., after a course of 80 m. For nearly 70 m. it is navigable for boats.

Hock'tide, or **Hoke'days,** Monday and Tuesday occurring two weeks after Easter, a former English festival in memory of Ethelred's great victory over the Danes, 1002. Tolls were taken at the town gates, and money was collected throughout the parish for the priest.

Ho'dell, Frans Oscar Leonard, 1840–90; Swedish dramatist; editor and proprietor, 1870–90, of *The Sunday Puck*; wrote or adapted more than 100 plays, including "Andersson, Petersson, and Lundström," "The Factory Girl," "Mr. Larsson's Trip to Paris."

Hodg'son, Shadworth Hollway, 1832– ; English metaphysician; b. Boston, Lincolnshire; president of the Aristotelian Society for the Systematic Study of Philosophy, London, after 1880; works include "Time and Space: a Metaphysical Essay," "The Theory of Practice," "The Philosophy of Reflection," "The Metaphysics of Experience," etc.

Hod-Mezö-Vasarhely (hōd-mā'-zö-vä-sär-häl'). See VASARHELY.

Hoe, Richard March, 1812–86; American inventor; b. New York; son of Robert Hoe, an ingenious English mechanician who became a manufacturer of printing presses in New York. In 1841, Richard Hoe, with his brothers, Robert Hoe and Peter Smith Hoe, assumed the whole business, the former partners retiring. In 1846 he brought out "Hoe's lightning press," extensively employed for newspaper work. It has since been much improved.

Ho'fer, Andreas, 1767–1810; Tyrolese soldier and patriot; b. in the Tyrol; became a vintner and horse merchant; took command of a party of riflemen serving against the French, 1796; led in the uprising of the people against the French and Bavarians, 1809; gained the important battles of Sterzing and Innspruck; defeated Lefebvre and drove him out of the province, and was declared ruler of the Tyrol.

Soon after, Austria was reduced to submission by Napoleon. Hofer was excluded from the amnesty for renewing hostilities, and, betrayed by one of his most trusted followers, was taken prisoner and shot by order of Napoleon at Mantua.

Hoffman, Friedrich, 1660–1742; German physician; b. Halle; became physician to the King of Prussia and Prof. of Medicine at Halle; was one of the first to maintain that the phenomena of living bodies are not to be explained by the laws of inanimate or inorganic nature, but that they depend on the continued action of life. Of the medicines which he invented, the *elixirium viscerale* and *liquor anodynus* are still used. He was the discoverer and introducer of Seidlitz waters, and of the salt obtained from them. His voluminous works are still of value.

Hoffmann von Fallersleben (fŏn fäl'lĕrs-lā-bĕn), **August Heinrich,** 1798–1874; German poet; b. Fallersleben; was keeper of the university library at Breslau, 1823–38, and Prof. of the German Language and Literature, 1830–42; 1854, settled at Weimar, and, 1860, became librarian of the Duke of Ratibor and Prince of Korvei. His works, archæological, historical, poetical, and miscellaneous, are numerous, and his popular songs acquired great celebrity, chiefly from their witty and liberal character.

Hofman (hŏf'mān), **August Wilhelm,** 1818–92; German chemist; b. Giessen; was Prof. of Chemistry in London, 1845–63; in Bonn, 1863–65, and in Berlin from 1865 till his death. His researches on aniline and similar bases led to the present conception of the constitution of aniline, so far as its relation to ammonia is concerned, and formed an important part of the foundation of what is called "modern chemistry."

Hog. See SWINE.

Ho'garth, William, 1697–1764; English painter and engraver; b. London; after serving as apprentice to a silver-plate engraver, set up for himself, 1720; published, 1724, the first of his many satirical prints, "Masquerades and Operas"; began to paint seriously in oil abt. 1726; produced some religious pictures and some admirable portraits; completed before 1731 the six important pictures of "The Harlot's Progress," which, like his other works, were engraved by himself; followed these with "The Rake's Progress," "Industry and Idleness," "Marriage à la Mode," and other works; published, 1753, his "Analysis of Beauty"; retained his wonderful powers to the last.

Hogg, James (called the "ETTRICK SHEPHERD"), 1772–1835; Scottish poet; b. Ettrick Parish; began to compose songs when twenty-four years old; became editor of *The Spy*, Edinburgh, 1810, and was the associate of Scott, Wilson, and other men of letters, and a frequent contributor to *Blackwood*; published "Scottish Pastorals, Poems, and Songs," "The Mountain Bard," and other works.

Hogs'head. See BARREL; COOPERAGE.

Hohenlinden (hō-ĕn-lĭn'dĕn), **Bat'tle of.** See MOREAU, JEAN VICTOR.

Hohenlohe (hō'ĕn-lō-ĕ), princely family of Germany, sprung from Franconia, where the Castle of Holloch was the family seat; since the twelfth century the possessors of this castle have called themselves lords of Holloch. In 1776 the counts of Hohenlohe were created princes of the empire. The family comprises two principal lines—Hohenlohe-Neuenstein and Hohenlohe-Waldenburg, of which the former is subdivided into the lines of Hohenlohe-Langenburg and Hohenlohe-Oehringen, the latter into those of Hohenlohe-Bartenstein and Hohenlohe-Schillingfürst; these lines consist furthermore of many branches. Its members famous in history include FRIEDRICH LUDWIG, Prince of Hohenlohe-Ingelfingen, 1746–1818, Prussian military officer, who distinguished himself at Weissenberg and Kaiserlauten, but was defeated by Napoleon at Jena, and capitulated at Preuzlau, 1806, with 17,000 men. CHLODWIG KARL VICTOR, Prince of Hohenlohe-Waldenburg-Schillingsfürst, 1819–1901, German statesman, did much for the unification of Germany as president of the Bavarian Ministry, and vice president of the German Zoll Parliament, 1868, 1869; was Governor of Alsace, 1883–94; Chancellor of the German Empire, 1894–1900.

Hohenstaufen (hō'ĕn-stow-fĕn), name of a princely family in Germany which arose in the middle of the eleventh century, bore the imperial crown from 1138 to 1254, and died out in the latter part of the thirteenth century. The family was founded by FRIEDRICH VON BÜREN in the eleventh century. His son, FRIEDRICH VON STAUFEN, or HOHENSTAUFEN, was distinguished for his valor and military talents. Thereafter the family rose rapidly. Finally one of its members, CONRAD, DUKE OF FRANCONIA, succeeded in being elected emperor, and the family held the dignity for more than a century in the persons of CONRAD III, 1138–52; FREDERICK I. BARBAROSSA, 1152–90; HENRY VI, 1190–97; PHILIP, 1197–1203; FREDERICK II, 1212–50; CONRAD IV, 1250–52. These men were conspicuous for vigor and energy, tending toward despotism, but generally allied with magnanimity and many brilliant qualities. The most prominent feature of their reign was their perpetual contest with the Guelphs and the popes, during which, however, the poetry and art of German chivalry reached their highest perfection.

Hohenzollern (hō'ĕn-tsŏl-ĕrn), princely family of Germany, from which the present imperial dynasty is descended; traces its history from Thassilo of Burchhardinger, who is thought to have built the Castle of Zollern, near Hechingen, about the beginning of the ninth century. The family divided into the Franconian and Suabian branches abt. 1165; the Suabian line into the Hohenzollern-Hechingen and Hohenzollern-Sigmaringen branches, 1576. Both were raised to princely rank in the seventeenth century. The male line of Hohenzollern-Hechingen became extinct, 1869.

Both lines had previously (1849) ceded their sovereignty to Prussia. To the younger line, the Franconian, belonged Albert of Brandenburg, who was acknowledged Duke of Prussia, 1525.

Hohenzollern, territory of SW. Germany, since 1850 an administrative division of Prussia, but previously forming two independent principalities, Hohenzollern-Hechingen and Hohenzollern-Sigmaringen; is a long and narrow strip, surrounded by Würtemberg, except on the SW., where it is bounded by Baden; area, about 440 sq. m.; is watered by the Neckar and the Danube; capital, Sigmaringen.

Ho'jo, name of the most powerful family in Japan during the century, 1490–1590. Succeeding to the power of the Ashikaga dynasty, which had ruled at Kamakura, the Hojo family established themselves at Odawara, 24 m. to the W. The capture of this castle by Hideyoshi, 1590, overthrew their power, and Yedo (Tokyo) became the new military capital.

Holbein (hōl'bīn), **Hans** (the ELDER), 1460–1524; German painter; b. Augsburg; studied under Schöngauer, but soon worked along original lines which placed him at the head of a new school. His earlier style follows the models of the early Flemish school, while later works show the influence of the Italian renaissance, and are generally considered better than his earlier works. Specimens of his best works are in the cathedral at Augsburg; others are in the Munich gallery, and in the Dominican church at Frankfort on the Main, and elsewhere. They include "The Fount of Life," "At Sebastian," "St. Katherine," "Virgin and Child," "Coronation of the Virgin," "Crucifixion," etc.

Holbein, Hans, or **Johann** (the YOUNGER), between 1495 and 1498–1543; German painter; went to Basel with his father, Hans the Elder, a painter. Abt. 1526 he contracted an intimacy with Erasmus, whose portrait he painted, and soon after visited England, where he passed the remainder of his life. Henry VIII made him court painter. He is distinguished as a historical and portrait painter, and engraver on wood. As an engraver he is chiefly known by the celebrated "Dance of Death," a series of fifty-three woodcuts engraved from his own designs, although it is seldom found with more than forty-six. There has been controversy in regard to the genuineness of some of the works ascribed to him, especially in respect to two pictures both claiming to be originals and representing the "Madonna of the Burgomaster Meyer of Basel"; one of these is in Darmstadt, and the other in Dresden.

Hol'berg, Ludvig, 1684–1754; Norwegian author; b. Bergen; traveled in Holland, France, and N. Italy; was, 1718, appointed professor at the Univ. of Copenhagen; accumulated great wealth, which he bequeathed to an educational institution, the Academy of Sorö; created baron, 1747. His sound, practical ideas, and clear, solid reasoning, sustained by learning and seasoned by humor, made his works on history, "Ecclesiastical History," "History of Denmark," "Jewish History," "Lives of Great Men and Women," and on philosophy, "Epistles and Moral Meditations," a most influential element in the Danish civilization.

Hol'iday, literally, a holy day; that is, a day set apart to holy or religious uses and observances, and hence any day set apart for relaxation or exemption from the ordinary cares and toil of life, either in commemoration of some event or for pleasure and rejoicing; and hence, in law, any day on which one or more legal obligations, as attendance upon court, service of notices, protesting of notes, etc., are remitted. Such days are called legal holidays. Though in the wide sense of the term Sunday is a legal holiday, the law with regard to contracts and the performance of judicial and ministerial duties is different from that of other holidays. In general, all works except those of "necessity and mercy" are illegal on Sunday in both the U. S. and Great Britain. When a note falls due on Sunday it is payable on the following Monday.

Holidays other than Sunday are entirely statutory, and all acts are valid, whether judicial or otherwise, unless expresly or by necessary implication declared invalid in the creating statute. In the case of these holidays a note falling due upon them is payable upon the day previous unless otherwise provided in the statute, either expressly or by necessary implication. Persons cannot be compelled to attend to legal business upon a legal holiday. An employee who is hired by the week, month, or year, who works on a general legal holiday at his employer's request, can recover extra remuneration; but a day declared a legal holiday for banking purposes, or the like, is not thereby made a general legal holiday. The legal holidays besides Sundays in the U. S. are the Fourth of July (observed in all the states), and generally Christmas, Thanksgiving Day (appointed by the President and the governors), New Year's Day, Washington's birthday, Decoration Day, Labor Day, and the general election days. Besides these special days or parts of days may be made holidays; thus in New York Saturday is a bank half holiday.

In England the office holidays of the Supreme Court are Good Friday, Monday and Tuesday in Easter week, Whit-Monday, Christmas Day and the next following working day, and days appointed by proclamation for fasting, thanksgiving, and humiliation. The bank holidays are, in England and Ireland, Easter Monday, the Monday in Whitsun week, the first Monday in August, and December 26th (or, if this be a Sunday, the day following); in Scotland, New Year's Day, Christmas Day (or, if either be a Sunday, the day following), Good Friday, the first Monday of May, and the first Monday of August.

Holland, Josiah Gilbert, 1819–81; American physician and author; b. Belchertown, Mass.; practiced medicine three years; was (1849–66) editorially connected with the Springfield *Republican*, and, 1870, became editor of *Scribner's Monthly*, New York. His works, some of

published under the name of "Timothy ıb," include a "History of Western chusetts," "The Bay Path," a novel; ers to the Young," "Bitter Sweet," a "Gold Foil," "Miss Gilbert's Career," el; "Lessons in Life," "Letters to the es," "Plain Talk on Familiar Subjects," of Lincoln," "Kathrina," a poem; "The e Prophecy," "Arthur Bonnicastle," nered Sheaves," poems; "The Mistress of ıanse," and "Nicholas Minturn."

land. See NETHERLANDS.

'lar, Wenzel, 1607–77; Bohemian engrav- . Prague; settled in London abt. 1636, xecuted portraits of the royal family, and of twenty-eight plates of female costume, ed "Ornatus Muliebris Anglicanus." Un- ıe commonwealth he suffered a short im- ıment, and lived several years in Antwerp, ıing 1652. He engraved Holbein's "Dance ıth," and other works of the old masters. rints numbered nearly 2,400.

'ly, species of various shrubs and small chiefly of the genus *Ilex* and family *eæ*. They are mostly evergreens, with reen leaves and red berries. The typical s is *I. aquifolium*, the European holly, leaves are so highly prized for Christ-

AMERICAN HOLLY.

decorations. Its bark yields bird lime, ıas medicinal powers. The finest Amer- species is the *I. opaca*, a small tree, used ın Christmas decorations, but its appear- is far inferior to that of the former spe- The wood of both the above species is hard and white, and is used by turners, ers, and carvers.

lly'hock, Hock, or Mal'low, so called be- said to have been imported from the Land; biennial plant of the genus *a* (*A. rosea, ficifolia, chinensis*), tall Old l herbs, much cultivated in gardens for flowers, of which there are many varie- single and double. The culture of these s for forage purposes has been proposed. The stalks abound in a fiber which may be utilized as paper stock.

Hol'man, William Steele, 1822–97; American jurist; b. Dearborn Co., Ind.; practiced law at Aurora, Ind.; judge of the Probate Court, 1843–46; prosecuting attorney, 1847–49; member of the Indiana legislature, and judge of the Court of Common Pleas, 1852–56; member of Congress, 1859–65, 1867–77, 1881–95, and 1897 till death; was known as "The Great Objector" and "The Watchdog of the Treasury," because he strenuously objected to what he considered extravagant appropriations.

Holmes, Augusta Mary Anne, 1847–1903; French composer; b. Paris; compositions include an opera, "Hero and Leander"; a psalm, "In Exitu Israel"; a symphony, "Orlando Furioso"; a symphony, "Lutece," which gained a prize at a competition; a symphony, "Les Argonauts"; a symphonic poem, "Irlande"; another, "Pologne"; and a symphonic ode with choruses, "Ludus pro Patria." She also wrote the text of her vocal compositions.

Holmes, Oliver Wendell, 1809–94; American physician and author; b. Cambridge, Mass.; became Prof. of Anatomy and Physiology in Dartmouth College, 1838, and in Harvard, 1847. In 1836 he published the first collected edition of his poems. In the *Atlantic Monthly* (Boston, 1857) he began a series of articles under the title of "The Autocrat of the Breakfast Table," which were followed by "The Professor at the Breakfast Table," and, 1872, by "The Poet at the Breakfast Table." As a writer of songs and lyrics, both humorous and serious, Dr. Holmes stands in the first rank. He also distinguished himself by his researches in auscultation and microscopy. In 1838 he published three "Boylston Prize Dissertations"; 1842, "Lectures on Homeopathy and its Kindred Delusions"; and, 1848, a "Report on Medical Literature." His later works include "Currents and Countercurrents in Medical Science," "Elsie Venner, a Romance of Destiny," "Songs in Many Keys," "Soundings from the Atlantic," "The Guardian Angel," "Mechanism in Thought and Morals," "Songs of Many Seasons," "A Mortal Antipathy," "One Hundred Days in Europe," "Before the Curfew," and "Over the Teacups."

Holothu'rian, one of the class *Holothuroidea*, a group of Echinoderms commonly known as "sea cucumbers," in allusion to the cucumber-shaped body. They are characterized by having the body drawn out in a wormlike manner, the mouth and vent being at opposite ends. In most forms the skin is leathery, and the calcareous plates, so characteristic of other Echinoderms, are entirely concealed in the integument. Only in a few cases do they form conspicuous plates on the outside. In many these plates are microscopic, and sometimes they are strangely regular and beautiful, forming favorite objects for microscopists. The Holothurians are without teeth, and the mud or coral sand on which they feed is forced into the mouth by means of the tentacles which surround that opening. The intestine is either straight or curiously looped within the body.

in some cases measuring forty times the length of the animal. Few species have any economic importance. In the Eastern seas certain spe-

HOLOTHURIAN (CLADODACTYLUS DOLIOLUM).

cies are taken in large quantities, dried in the sun, and sent to China, where, under the name trepang, they are used for soup.

Holofernes (hŏl-ō-fêr'nēz). See JUDITH.

Holst, Hans Peter, 1811–93; Danish poet and novelist; b. Copenhagen; was made famous by his "Memorial Poem on Frederick VI"; published a volume of poems, "At Home and Abroad" (prose and verse), "The Little Bugler," and a collection of war poems; also wrote several comedies and vaudevilles.

Holst, Hermann Eduard von, 1841–1904; American historian; b. Fellin, Livonia; in 1866 settled in St. Petersburg, but, having published a pamphlet displeasing to the Russian Govt., emigrated to the U. S.; was appointed professor at Strassburg Univ., 1872, and, two years later, of Modern History at Freiburg; afterwards revisited the U. S., lectured at Johns Hopkins Univ., and was Prof. of History at the Univ. of Chicago, 1892–1900; chief works, "The Constitutional and Political History of the United States," and "The Constitutional Law of the United States of America."

Holstein (hōl'stīn), duchy which forms part of the Prussian province of Schleswig-Holstein; between the Baltic and the German Ocean, and between the Elbe and the Eider, which separate it respectively from Hanover and Schleswig. The rearing of cattle and the production of butter and cheese, together with agriculture, are the main branches of industry.

Holtei (hōl'tī), **Karl von,** 1798–1880; German poet and novelist; b. Breslau; spent his life as an actor, theater secretary, manager, etc.; published dramas, including "The Old Commander," and "The Tragedy at Berlin"; novels, including "The Vagabonds" and "Noblesse Oblige," and several volumes of poems.

Holub (hō'lōp), **Émil,** 1847–1902; Austrian explorer and naturalist; b. Holitz, Bohemia; made explorations in S. Africa, 1872–79, 1883–86; made the largest collections in natural history ever brought from Africa by one explorer; published "Seven Years in South Africa," "Ornithology of South Africa," etc.

Ho'ly Alli'ance, compact entered into at Paris, September 26, 1815, by the sovereigns of Russia, Austria, and Prussia, and afterwards joined by the other European powers with the exception of Great Britain, Turkey, and the pope, and published February 2, 1816. Its design was to exclude all members of the Bonaparte family from the thrones of Europe forever; to express the intention of the contracting powers to live together in Christian harmony; and to induce the people to faithful daily fulfillment of Christian duties; but under the controlling influence of Metternich it became an instrument for the suppression of liberalism in Europe. After the Congress of Aix-la-Chapelle its policy became clearly marked, and was illustrated in the congresses of Laibach, Troppau, and Verona, which resulted in armed intervention in the affairs of Italy and Spain.

Holy Broth'erhood. See HERMANDÁD.

Holy Coat of Treves, The, garment preserved in the Cathedral of Treves, in Germany, and supposed by many Roman Catholics to be the veritable seamless garment which was worn by Christ at his crucifixion, and for which the soldiers cast lots. The church authorities of Treves maintain that it has been in their possession since the early part of the fourth century, when the Empress Helena brought it there from the East. Frequent pilgrimages are made to this shrine. Occasionally the relic is exposed.

Holy Commun'ion. See EUCHARIST.

Holy Cross, Congrega'tion of the, association of regular clerks, founded by the Abbé Moreau, 1834. Their present rule was approved, 1856, in which year the Brotherhood of St. Joseph was merged into this congregation. They were introduced into the U. S., 1842. There is a congregation of Canons Regular of the Holy Cross (anciently called Crutched Friars in England), founded 1211. They have a college at Watertown, Wis., and are numerous in continental Europe; are called Croisiers and Cross Bearers.

Holy Cross, Sis'terhood of the, association founded 1834 by the Abbé Moreau, at Mons, Belgium. The rule was approved, 1857. There are two orders of Daughters of the Cross and one of Sisters of the Cross, independent of the above.

HOLY GHOST FLOWER

Holy Ghost Flow'er, or **Dove Flower,** *Peristeria elata*, an orchidaceous plant of Central America, having white symmetrical floral envelopes, and the stamens and pistil united into a column which curi-

ously resembles a bird with expanded wings. It is venerated in its native regions as the symbol of the Holy Dove.

Holy Ghost, Or'der of the (Roman Catholic). (1) Order at first consisting of hospital knights of St. Augustine; was founded 1178 by Guido of Montpellier, and in part removed to Rome, 1204, receiving the hospital in Sassia. Here they became in part canons regular, and after many vicissitudes the knightly branch of the order ceased, 1700, to exist. In 1254 the Hospitallers of the Holy Ghost, a secular branch of the above, were organized, containing both brethren and sisters. The latter, called White Sisters, are still numerous and active. With them became connected another sisterhood of the Holy Ghost, established 1212. (2) Another congregation of canons of the Holy Ghost was confirmed, 1588. (3) Congregation of the Holy Ghost, founded by Claude Desplaces in Paris, 1703, united, 1848, with the Congregation of the Immaculate Heart of Mary, founded, 1841, by François Marie Paul Libermann. It carries on works epecially among the blacks in Africa.

Holy Grail. See SANGREAL.

Hol'yhead, seaport of N. Wales; on an island of the same name; connected with the main portion of Anglesea by a huge causeway and a bridge; 60 m. E. of Dublin. Shipbuilding and rope making are carried on. Holyhead is most notable for the breakwater by which harbor accommodation is provided for the packet service between England and Ireland, and at the same time an important harbor of refuge is constituted. Pop. (1901) 10,079.

Ho'ly In'nocents' Day. See INNOCENTS' DAY.

Holy Is'land, or **Lindisfarne',** island, 2 m. off the coast of Northumberland, England; can be reached at low tide by walking across the uncovered sands; became a bishop's see, 635, and was the episcopal seat of St. Cuthbert. Holy Island is a favorite bathing place, and its old castle and ruined abbey are interesting objects.

Holy Land. See PALESTINE.

Holy League, name applied to several alliances of European princes for war or defense. (1) That of 1511, between the pope, Julius II, Spain, and Venice, to expel the French from Italy. It lasted till the Truce of Orthes (1513). (2) That of Nuremberg (1538) between Charles V and the Catholic princes of Germany against the League of Schmalkald. (3) That of 1571, of the pope, Venice, and Spain against the Turks. (4) The league entered into, 1576, at Péronne, by the heads of the Catholic party in France, under the leadership of Guise, for resistance to the spread of Protestantism and opposition to the succession of the Calvinistic princes to the French throne. The league was anything but holy, either in purpose or in proceedings, and it led to the renewal of the bloody civil wars, which were not ended until 1590, when Henry IV of Navarre won the battle of Ivry against the forces of the league under the Duke of Mayenne. (5) That of 1609 between the pope and the Catholic states of Suabia and Bavaria. (6) That of 1684, Poland, Germany, and Venice against the Turks.

Holyoake (hōl'yōk), **George Jacob,** 1817–1906; English social and religious reformer; b. Birmingham; after teaching, lecturing, and engaging in journalism, became one of Robert Owen's "social missionaries" at Sheffield; soon after, Owen's second lieutenant, and was the principal exponent of his movement, and its principal historian; was imprisoned for blasphemy, 1841; became active in advocating coöperation and in founding secular societies; was president of the London Secular Society until 1858; edited *The Reasoner*, and *The New Moral World*; published "History of Coöperation," "Sixty Years of an Agitator's Life," etc.

Ho'ly Of'fice. See INQUISITION.

Hol'yoke, city in Hampden Co., Mass.; on the Connecticut River; 8 m. N. of Springfield; is widely noted for its great water-power system, embracing a dam 1,000 ft. long in the river, a series of distributing canals, and powerful turbines, which supplies nearly all of its extensive mills. The distinctive industry is the manufacture of paper in many grades and forms; others are cotton and woolen goods, foundry and machine-shop products, automobiles, turbines, steam engines, carriages and wagons. The U. S. census of 1905 reported 179 factory-system manufacturing plants, operated on a capital of $37,150,103, and having a combined output valued at $30,731,332. Pop. (1905) 49,934.

Holyoke, Mt., steep, narrow ridge of greenstone trap in Hampshire Co., Mass., separating the towns of Hadley and Amherst on the N. from S. Hadley and Granby on the S.; is 7 m. long, and terminates in Belchertown on the E. Its W. extremity is separated from Mt. Tom by a cleft through which the Connecticut River flows. The highest point is 1,120 ft. above the sea.

Ho'ly Rood, or **True Cross,** the cross on which Jesus was crucified, discovered by St. Helena, mother of the Emperor Constantine, in Jerusalem, 326, or, according to Eusebius, 328, in a cave over which has since been built the Church of the Holy Sepulcher. The location of the tomb of Jesus had been traditionally identified from the earliest times. In removing the structures that had been placed over it at various times, the workmen, preparing the ground for a church to be erected by Constantine, came upon a cave in which three crosses were found lying together. The true cross was identified by the fact that its touch miraculously healed a woman who had been seriously ill for years, and raised to life a dead man, after the other two crosses had been ineffectually tried. The title of the cross of Jesus was found at the same time, and also the four nails. Two of them are said to have been used by Constantine in his bridle, and

another in the head of his statue, while the fourth, dropped by Helena into the sea on her return voyage, calmed a storm which was then raging. The story of the finding of the true cross, originally told by Eusebius, is substantiated by St. Cyril of Jerusalem, St. Ambrose, Theophanes, Nicephorus, Calixtus, Rufinius, and others, most of whom were contemporaries, and none of whom are separated by more than a generation or two from the events related.

The true cross was preserved in the church built by Constantine over the site of the holy sepulcher, which was dedicated in 335. Part of the cross, however, was sent by his mother to Constantine in Constantinople. The title was sent to Rome, and preserved there in the basilica of Santa Croce in Gerusalemme, specially erected for the purpose by Constantine in 331. This relic is still shown to the faithful on Easter Sunday. There is a good record, however, of all the churches throughout the world, more than 100 in number, in which portions of the true cross are preserved. Careful estimation of the quantity of wood shows that these are much less than the original cross of the Savior must have contained.

Ho'lyrood, Pal'ace and Ab'bey of, in Edinburgh at the E. extremity of the old town, at the foot of the Canongate. The palace is a large quadrangular building of hewn stone with a court within. It was the former residence of the kings. Charles X of France, after his flight in 1830, resided there for some time. Within the palace are the modernized royal apartments and the rooms associated with the events in the reign of Mary Queen of Scots; also a gallery containing mythical portraits of Scottish sovereigns. Adjoining the palace are the ruins of the abbey founded in 1128, which contains the ashes of numerous members of the Scotch royalty.

Ho'ly Sav'ior, Or'der of the. See BRIDGET, SAINT.

Holy Sep'ulcher, tomb in which Christ lay. It was hewn out of a rock in a garden in the place of the crucifixion, just outside the walls of Jerusalem. In the opinion of many the spot has not yet been identified, and never will be. The traditional site, fixed upon early in the fourth century, is a cave now inclosed in marble within the pile of buildings known as the Church of the Holy Sepulcher. The edifice contains chapels for Greeks, Latins, and Armenians, with smaller apartments for Copts, Jacobites, and Maronites.

Holy Sepulcher, Or'der of the, (1) CANONS REGULAR AND CANONESSES OF (Augustinian), founded at Jerusalem, 1099 or 1114. They spread throughout Europe. The canons ceased to exist in the seventeenth century, but there are still nuns who live in seclusion and instruct children. (2) KNIGHTS OF THE HOLY SEPULCHER, perhaps founded by Alexander III, and still found in small numbers. They are appointed by the pope as guardian father, and by the Patriarch of Jerusalem. The Latin Patriarch of Jerusalem is grand master. An order of this name existed in England from 1174 to the seventeenth century. The Franciscans once had the sole right to confer this rank.

Holy Spir'it Plant. See HOLY GHOST FLOWER.

Holy Thurs'day. See ASCENSION DAY.

Holy Wa'ter, in the Greek, Roman Catholic, and the various Oriental churches, water which has been blessed by a priest, and is used in religious ceremonies. Its use in churches is very ancient, and it is by many believed to be derived from a custom of the ancient Hebrews.

Holy Week, last seven days of Lent, the week before Easter, popularly known in continental Europe as *Still Week*—often called *Passion Week*, but that name is also given to the week preceding it; contains Palm Sunday, Spy Wednesday, Maundy or Holy Thursday, Good Friday, and Holy Saturday; is a penitential season, in commemoration of Christ's passion and death.

Hol'ywell, town of Flintshire, N. Wales; 15 m. NW. of Chester; received its name from the well of St. Winifred, which is said to be the most copious spring in Great Britain. In its vicinity are found the richest coal, lead, and copper mines in the kingdom, and, besides its manufacture of cotton and flannel, Holywell has many establishments for lead and copper smelting. Pop. (1901) 2,652.

Homburg (hōm'bŏrkh), town of central Germany; capital of the former landgraviate of Hesse-Homburg; 8 m. NNW. of Frankfort on the Main; is famous for its mineral springs and elegant bathing establishments, which, before the closing of the gambling saloons, 1872, attracted more than 10,000 visitors annually. On a neighboring hill stands the castle of the former landgraves, built in 1680, and afterwards several times enlarged. Pop. (1900) 9,635.

Home, Daniel Dunglas, 1833–86; Scottish spiritualist; b. near Edinburgh; was adopted by an aunt who took him to the U. S., and became distinguished as a spiritualistic medium; resided mainly in Europe after 1855; became secretary of The Spiritual Athenæum, London, 1866; published "Lights and Shadows of Spiritualism"; also two volumes of an autobiographical character.

Home, Henry. See KAMES, HENRY HOME.

Home, or **Hume, John,** 1722–1808; Scottish dramatist; b. Ancrum; fought on the Hanoverian side in the rebellion of 1735; was appointed minister at Athelstaneford, 1746. In 1756 his tragedy of "Douglas" was produced at Edinburgh with great success, but the circumstance that it was written by a clergyman caused such a scandal that Home resigned his office, 1757. George III gave him a pension and a sinecure office, and he continued to write tragedies—"Alonzo," "Alfred," etc.; also wrote a "History of the Rebellion of 1745."

Homel (hō-mĕl'), town of Russia; government of Mohileff; 132 m. S. of Mohileff; on

the Sosh, an affluent of the Dnieper; has important sugar refineries, and carries on a brisk trade in the agricultural products of the surrounding country. Pop. (1897) 36,846.

Homeop'athy, system of therapeutics founded on the principle that "like cures like," that is to say, that a drug is capable of removing morbid conditions, naturally existing, which are similar to those it is capable of producing. This principle or law in therapeutics was first announced by Hippocrates long before the Christian era as one of the methods of applying drugs for removing disease, but owing to the fact that the knowledge of what drugs were capable of producing was extremely limited, and also that Hippocrates made no effort to increase his knowledge in that direction, the application of the law soon fell into disuse. It was rediscovered and announced by Hahnemann, 1796, in Hufeland's *Journal*, in a paper entitled "An Attempt to Find a New Principle for the Discovery of the Healing Power of Medicines." Hahnemann collected and arranged all that was known concerning the positive effects of drugs on the healthy, and also made extensive investigations into the properties of new drugs by experimenting with them on himself, his family, and his friends. Hahnemann discovered, proved, and applied as many as ninety-six remedies. This number has been steadily increased by his followers, and now as many as nine hundred remedies are "booked."

The principles of homeopathy would be inapplicable without a knowledge of drug effects upon the healthy, and at first a record of all cases of poisoning was made, and this was supplemented by experiments. Thus it is noticed that aconite produces a well-marked faceache (tic douloureux), and hence, according to homeopathic principles, will cure it, provided the pain be similar to that produced by aconite, as the disease will be supplanted by a passing drug effect and the patient cured. It is necessary to avoid producing in the sick new effects of the drug, or adding to the violence of the disease, and it is found that incredibly minute quantities of drugs are capable of obliterating the symptoms of a patient, the more so as diseased organs are more sensitive than healthy organs to drugs which act directly upon them. See ALLOPATHY; MEDICINE.

Ho'mer, earliest of all Greek poets whose works were known in the classical period, and acknowledged in modern times to be the chief of all epic poets; birthplace unknown, though more than seven cities, including Smyrna, Rhodes, and Athens, claimed him; by Herodotus was thought to have lived abt. 850 B.C., while others placed him abt. 750 B.C. Until the nineteenth century he was regarded as the author of the "Iliad" (The Poem of Ilium), and the "Odyssey" (The Poem of Odysseus), each of which is divided into twenty-four books. These are now believed to be of composite authorship, but a certain unity exists, which is due to some poet who, for convenience, may be called Homer. The testimony of archæology favors the view that the poems were composed perhaps eight or nine centuries B.C., although they may not have been in their present form before 700 B.C. Some of the ancients ascribed to Homer "The Battle of the Frogs and Mice" (Batrachomyomachia), several poems, and a collection of thirty-four so-called hymns.

Home Rule, in general, the control of its own affairs by a political division; specifically, the principle on which a strong party in British politics desires to fix the governmental relations of Ireland to Great Britain. The movement for home rule is the most recent form in which the Irish political consciousness has formulated its protest against the union of Great Britain and Ireland, effected by Pitt, 1800. The formal beginning of the home-rule movement dates from May 19, 1870, when an association was formed in Dublin for the purpose of obtaining for Ireland the right and privilege of managing her own affairs by a national parliament, whose competence should include all matters relating to her internal affairs, and control over Irish resources and revenues, subject to the obligation of paying a just proportion of the imperial expenditure. A reorganization was effected 1873, and the name was changed to the Home Rule League. In the general elections of 1874 Charles Stewart Parnell became the leader of the movement, and radicalized it and the party by putting himself at the head of the Irish Land League, 1879. In 1882 the Irish National League was formed. In 1885 the Nationalists united with the Conservatives in overthrowing the Gladstone government, and in the ensuing elections secured 85 out of the 103 Irish seats and one from England, thus obtaining the balance of power in the House of Commons. In 1886 Mr. Gladstone introduced a home-rule bill, providing for a legislative body to sit at Dublin and to exercise the law-making power for Ireland over all subjects save those especially reserved for the imperial Parliament, but this was defeated. Meantime, 1891, those opposed to Parnell as a leader had seceded from the National League, and formed the National Federation. In 1893 Gladstone introduced his second bill, providing for a legislative body of two houses, the members of the upper to be chosen by electors having a property qualification, giving complete self-government in local matters, decreasing the Irish representation in the House of Commons, and withholding from the Irish members the right to vote on cabinet questions. This passed the Commons, but was defeated by the House of Lords. In 1898 an act providing for free local government for Ireland passed both houses.

Home'stead, borough in Allegheny Co., Pa.; on the Monongahela River, 8 m. SE. of Pittsburgh; contains one of the largest steel-manufacturing plants in the U. S.; also has manufactures of glass and firebrick. In July, 1892, the borough was a scene of a serious labor disturbance, which necessitated the calling out of the National Guard of the state. Pop. (1900) 12,554.

Homestead Laws, in the U. S., legislation enacted to secure to some extent the enjoy-

ment of a home and shelter for a family or individual by exempting, under certain conditions, the residence occupied by the family or individual from liability to be sold for the payment of the debts of its owner, and by restricting his right of free alienation. The word homestead in ordinary usage signifies simply the place where the family resides and has its home, but in legal language the word has the special signification of the family residence owned and occupied in compliance with certain statutory regulations, by operation of which the owner's right of alienation is subjected to certain restraints, and the property is protected by certain exemptions from being sold upon judgment and execution. Nearly all of the states and territories have passed homestead laws, which vary one from the other in many of their provisions, but with a few exceptions they have certain characteristics in common.

The laws of the states provide in general that a homestead exemption may be claimed by a husband or other head of a family (and in some states a widow, or, under certain circumstances, a wife) by claiming the right according to the methods prescribed by statute —that is, generally by placing on record a written declaration of the claim. The homestead must be owned and occupied by the claimant, and may be held either by freehold, leasehold, or equitable title only. A temporary absence, with intent to return, will not take away the homestead exemption right where it is made dependent on occupation. In the case of the exemption being claimed by a married person, it can be alienated or incumbered only by the joint deed or consent of husband and wife, and after the death of the owner, leaving minor children surviving, the alienation or incumbrance is absolutely restricted during the minority of the children.

The homestead property remains liable without exceptions for purchase-money debt; for state, county, city, and school taxes; and generally for mechanics' laborers', and material men's liens, for improvements thereon, and (with more numerous exceptions) for other liens by laborers or mechanics, for fiduciary obligations of an officer, guardian, or trustee, and for a tort of the owner or wife. The amount of property exempted varies in rural land from 40 to 200 acres; in land in a city, town, or village, from one lot to an acre, and in the case of one state, five acres in small towns; it varies in money value from $500 to $5,000. In addition to these state laws the Federal homestead laws have parceled out nearly 90,000,000 acres to homestead settlers. These allotments were made to any citizen or person having declared his intention of becoming a citizen, and being twenty-one, or the head of a family. The homesteads were of 160 acres, or less, and full title was given after five years' residence and cultivation. Ex-soldiers and their heirs were given a preference. The land was practically given free, the only payment required being fees amounting to about $25.

Hom'icide, the killing of one human being by another. The word "homicide" comprehends every human act, whether innocent or criminal, having human death as its result. Homicide, at common law, is divided into three classes—justifiable, excusable, and felonious. From the first the second is distinguished as involving some measure of guilt, justifiable being entirely guiltless. But this distinction was practically obliterated when, at an early period, the penalty for excusable homicide, *viz.*, forfeiture of goods, ceased to be enforced. In legal theory, however, a distinction is still made, and it is convenient to treat defensible homicide under the two heads.

I. *Justifiable Homicide* is of four kinds. (1) Where the proper officer executes a criminal in strict conformity with his sentence. Such an act is, of course, obligatory upon the officer as a legal duty. He must, however, follow the sentence precisely, otherwise the act may amount to murder. (2) Where an officer of justice (or a person acting in his aid), in the proper performance of a legal act, obligatory upon him, kills a person who resists or prevents him from executing it. (3) Where the prevention of an atrocious crime renders the homicide necessary. Whenever any offense of a felonious nature is attempted, such as murder, robbery, burglary, arson, rape, etc., either the person whose life or property is endangered, or anyone who has knowledge of the intended crime, may use every effort to prevent its commission, and causing the death of the offender is justifiable if the imminent danger cannot otherwise be averted. Nor is it essential to his justification to show that the crime would actually have been perpetrated if the act of homicide had not been performed. For a person under such circumstances is warranted in acting upon a natural and reasonable presumption. (4) Killing of the enemy during time of war in the actual prosecution of hostilities is, of course, justifiable, on the ground of military necessity.

II. *Excusable Homicide is of two kinds.* (1) By misadventure or accident. Such homicide is innocent only when the person committing it is engaged in a lawful act, without intention of inflicting injury upon another, and without any failure to use proper precautions to prevent danger. If the act is unlawful, the homicide will be felonious. The lawful act resulting in death may be the administering of reasonable correction by a parent or school teacher, or other person occupying a position of similar authority. But the homicide is only innocent in such a case when the severity of the punishment is kept within due bounds. In like manner, if by some mischance one of several persons engaged amicably in athletic sports should be killed, he who occasioned the death would be innocent. (2) Homicide in self-defense, or in protection of one's property, or wife, child, parent, or servant. Under this head are not included cases of defense against felonious crimes, such acts of defense being justifiable, but only against any other modes of attack or injury which may be attempted, as in cases of common assault or trespass, where there is no intention to commit a felony. The distinction is important, on account of the larger legal obligation imposed, in this lat-

ter class of defensive acts, upon the person against whom an offense is perpetrated, to seek to avoid committing homicide. When any felony is attempted, the person whose life or property is endangered is under no obligation to seek to avoid the threatened injury by using every peaceable means, but when the attempted injury is not felonious, homicide must not be committed unless all other available means are first adopted and fail. Therefore, in case of simple assault, though the person assailed may protect himself by blows, he must "retreat to the wall," or forbear as long as is consistent with safety, before he ventures to kill his assailant.

In the defense of property, retreat is not necessary in order that the homicide may be excused (or justified), since that would be yielding the property without attempting protection; but the wrongdoer must first be requested to depart or to refrain from interfering with goods before force is applied, and even then the trespasser must not be killed or maimed unless his persistence makes such action necessary. In the U. S. crimes are generally defined by statute, and the principles relating to homicide have thus received various, but rarely substantial, modifications.

For felonious homicide, see MANSLAUGHTER; MURDER.

Homilet'ics, science which treats of the structure, composition, and delivery of a sermon. The word homiletics was first used in the latter half of the seventeenth century. For a long while it was considered as the synonym of "sacred rhetoric." Homiletics presupposes both logic and rhetoric, and builds its system on them, applying their principles to the work of the Christian pulpit. The sermon is distinguished from all other orations both by its subject and its object; it finds its motive, its authority, its materials, and its end in the Word of God; it speaks of and for God to men; and it aims to bring men to God in faith and love and service.

Hom'ily, familiar and informal discourse. It is impossible to discriminate sharply between the homily and the sermon on the ground of their intrinsic qualities. It is customary to say that the homily is a more familiar and informal discourse than the sermon. One of the early provincial councils in the sixth century enjoined that "if for any reason the presbyter could not preach, the deacons should read 'homilies of the holy fathers.'" The homilies were arranged according to the festivals and seasons of the ecclesiastical year, and the passage for the day was called a *pericope*, or section. Hence the use of homilies in the churches came to be known as the "pericopic system." Each homily began with the words "Post illa verba textus" (after these words of the text), and so these homilies were popularly known as "postils." Hence in the Latin of the Middle Age *postillare* meant to preach or to read a homily. In the reign of Edward VI, what is known in England as the "First Book of Homilies" was prepared and published, 1547, under the direction of Cranmer. Under Elizabeth, 1563, the "Second Book of Homilies" was edited by Jewell. In both of these volumes various preachers are represented. These homilies were designed for the use of the inferior clergy who were not qualified to make sermons; the language of the article which enjoined their use requires that they may be read in churches by the ministers, diligently and distinctly, that they may be "understanded of the people."

Homs (hōms), or **Hums** (hŭms), the *Emesa* of Strabo and Pliny; town of Syria, in the valley of the Orontes; 1 m. E. of the river and about 86 m. NE. of Damascus; became a Roman colony under Caracalla, 211–217 A.D., and was noted for its splendid Temple of the Sun. Here Zenobia, Queen of Palmyra, was defeated by the Emperor Aurelian, 273 A.D. The modern town is a place of considerable trade, and has a population of about 30,000.

Hon'da, city of Colombia, department of Tolima; on the Magdalena; 700 ft. above the sea; is the principal river port of the Magdalena and of the republic, and the center of a large portion of the trade with the interior. Steamers load and unload at Caracoli, just below.

Hon'do. See JAPAN.

Hondt (hōnt), name of a celebrated family of Flemish engravers. JOSSE HONDT (1546–1611), the founder of the family, spent a large part of his time in England, and was celebrated as an engraver of maps. HENRY DE HONDT, THE ELDER (1573–1610), executed a series of 144 portraits of artists, mostly Flemish, and of Melanchthon, Bugenhagen, Wyclif, Savonarola, Calvin, and Knox. HENRY DE HONDT, THE YOUNGER (1581–1650), engraved portraits of Queen Elizabeth and William of Orange, and a view of The Hague. ABRAHAM HONDT (1638–91) was celebrated not only as an engraver, but also as a painter of animals.

Honduras (hŏn-dō'răs), republic of Central America; bounded N. and NE. by the Caribbean Sea, SE. by Nicaragua, SW. by the Bay of Fonseca and Salvador, NW. by Guatemala; area, 46,250 sq. m.; pop. (1905) 500,136; capital, Tegucigalpa. Honduras consists essentially of a central plateau. It lies to the E. of the main Cordillera, and averages about 3,000 ft. in height. The Cordillera proper runs on the whole parallel to the Pacific coast, at a distance of about 50 m., but does not exceed 10,000 ft., is serpentine, and at Comayagua, near the center of the republic, is broken by a plain from 5 to 15 m. broad and about 40 m. long, called the plain of Comayagua. The only volcanoes are on the islands in the Bay of Fonseca. From the Cordillera low ranges of mountains extend irregularly, especially toward the NE. The principal river, and the largest in Central America, is the one forming the SE. boundary, called the Wanks in English, but also given the name of Segovia, Coco, and Yoro. It is 400 m. long. Next in size is the Ulua, near the N. boundary. Parallel to it, and for much of its course only a few

Both lines had previously (1849) ceded their sovereignty to Prussia. To the younger line, the Franconian, belonged Albert of Brandenburg, who was acknowledged Duke of Prussia, 1525.

Hohenzollern, territory of SW. Germany, since 1850 an administrative division of Prussia, but previously forming two independent principalities, Hohenzollern-Hechingen and Hohenzollern-Sigmaringen; is a long and narrow strip, surrounded by Würtemberg, except on the SW., where it is bounded by Baden; area, about 440 sq. m.; is watered by the Neckar and the Danube; capital, Sigmaringen.

Ho'jo, name of the most powerful family in Japan during the century, 1490–1590. Succeeding to the power of the Ashikaga dynasty, which had ruled at Kamakura, the Hojo family established themselves at Odawara, 24 m. to the W. The capture of this castle by Hideyoshi, 1590, overthrew their power, and Yedo (Tokyo) became the new military capital.

Holbein (hōl'bīn), **Hans** (the Elder), 1460–1524; German painter; b. Augsburg; studied under Schöngauer, but soon worked along original lines which placed him at the head of a new school. His earlier style follows the models of the early Flemish school, while later works show the influence of the Italian renaissance, and are generally considered better than his earlier works. Specimens of his best works are in the cathedral at Augsburg; others are in the Munich gallery, and in the Dominican church at Frankfort on the Main, and elsewhere. They include "The Fount of Life," "At Sebastian," "St. Katherine," "Virgin and Child," "Coronation of the Virgin," "Crucifixion," etc.

Holbein, Hans, or **Johann** (the Younger), between 1495 and 1498–1543; German painter; went to Basel with his father, Hans the Elder, a painter. Abt. 1526 he contracted an intimacy with Erasmus, whose portrait he painted, and soon after visited England, where he passed the remainder of his life. Henry VIII made him court painter. He is distinguished as a historical and portrait painter, and engraver on wood. As an engraver he is chiefly known by the celebrated "Dance of Death," a series of fifty-three woodcuts engraved from his own designs, although it is seldom found with more than forty-six. There has been controversy in regard to the genuineness of some of the works ascribed to him, especially in respect to two pictures both claiming to be originals and representing the "Madonna of the Burgomaster Meyer of Basel"; one of these is in Darmstadt, and the other in Dresden.

Hol'berg, Ludvig, 1684–1754; Norwegian author; b. Bergen; traveled in Holland, France, and N. Italy; was, 1718, appointed professor at the Univ. of Copenhagen; accumulated great wealth, which he bequeathed to an educational institution, the Academy of Sorö; created baron, 1747. His sound, practical ideas, and clear, solid reasoning, sustained by learning and seasoned by humor, made his works on history, "Ecclesiastical History," "History of Denmark," "Jewish History," "Lives of Great Men and Women," and on philosophy, "Epistles and Moral Meditations," a most influential element in the Danish civilization.

Hol'iday, literally, a holy day; that is, a day set apart to holy or religious uses and observances, and hence any day set apart for relaxation or exemption from the ordinary cares and toil of life, either in commemoration of some event or for pleasure and rejoicing; and hence, in law, any day on which one or more legal obligations, as attendance upon court, service of notices, protesting of notes, etc., are remitted. Such days are called legal holidays. Though in the wide sense of the term Sunday is a legal holiday, the law with regard to contracts and the performance of judicial and ministerial duties is different from that of other holidays. In general, all works except those of "necessity and mercy" are illegal on Sunday in both the U. S. and Great Britain. When a note falls due on Sunday it is payable on the following Monday.

Holidays other than Sunday are entirely statutory, and all acts are valid, whether judicial or otherwise, unless expressly or by necessary implication declared invalid in the creating statute. In the case of these holidays a note falling due upon them is payable upon the day previous unless otherwise provided in the statute, either expressly or by necessary implication. Persons cannot be compelled to attend to legal business upon a legal holiday. An employee who is hired by the week, month, or year, who works on a general legal holiday at his employer's request, can recover extra remuneration; but a day declared a legal holiday for banking purposes, or the like, is not thereby made a general legal holiday. The legal holidays besides Sundays in the U. S. are the Fourth of July (observed in all the states), and generally Christmas, Thanksgiving Day (appointed by the President and the governors), New Year's Day, Washington's birthday, Decoration Day, Labor Day, and the general election days. Besides these special days or parts of days may be made holidays; thus in New York Saturday is a bank half holiday.

In England the office holidays of the Supreme Court are Good Friday, Monday and Tuesday in Easter week, Whit-Monday, Christmas Day and the next following working day, and days appointed by proclamation for fasting, thanksgiving, and humiliation. The bank holidays are, in England and Ireland, Easter Monday, the Monday in Whitsun week, the first Monday in August, and December 26th (or, if this be a Sunday, the day following); in Scotland, New Year's Day, Christmas Day (or, if either be a Sunday, the day following), Good Friday, the first Monday of May, and the first Monday of August.

Holland, Josiah Gilbert, 1819–81; American physician and author; b. Belchertown, Mass.; practiced medicine three years; was (1849–66) editorially connected with the Springfield *Republican*, and, 1870, became editor of *Scribner's Monthly*, New York. His works, some of

them published under the name of "Timothy Titcomb," include a "History of Western Massachusetts," "The Bay Path," a novel; "Letters to the Young," "Bitter Sweet," a poem; "Gold Foil," "Miss Gilbert's Career," a novel; "Lessons in Life," "Letters to the Joneses," "Plain Talk on Familiar Subjects," "Life of Lincoln," "Kathrina," a poem; "The Marble Prophecy," "Arthur Bonnicastle," "Garnered Sheaves," poems; "The Mistress of the Manse," and "Nicholas Minturn."

Holland. See NETHERLANDS.

Hol'lar, Wenzel, 1607–77; Bohemian engraver; b. Prague; settled in London abt. 1636, and executed portraits of the royal family, and a set of twenty-eight plates of female costume, entitled "Ornatus Muliebris Anglicanus." Under the commonwealth he suffered a short imprisonment, and lived several years in Antwerp, returning 1652. He engraved Holbein's "Dance of Death," and other works of the old masters. His prints numbered nearly 2,400.

Hol'ly, species of various shrubs and small trees, chiefly of the genus *Ilex* and family *Ilicineæ*. They are mostly evergreens, with rich green leaves and red berries. The typical species is *I. aquifolium*, the European holly, whose leaves are so highly prized for Christmas decorations. Its bark yields bird lime, and has medicinal powers. The finest American species is the *I. opaca*, a small tree, used also in Christmas decorations, but its appearance is far inferior to that of the former species. The wood of both the above species is very hard and white, and is used by turners, inlayers, and carvers.

AMERICAN HOLLY.

Holly'hock, Hock, or **Mal'low,** so called because said to have been imported from the Holy Land; biennial plant of the genus *Althæa* (*A. rosea, ficifolia, chinensis*), tall Old World herbs, much cultivated in gardens for their flowers, of which there are many varieties, single and double. The culture of these plants for forage purposes has been proposed. The stalks abound in a fiber which may be utilized as paper stock.

Hol'man, William Steele, 1822–97; American jurist; b. Dearborn Co., Ind.; practiced law at Aurora, Ind.; judge of the Probate Court, 1843–46; prosecuting attorney, 1847–49; member of the Indiana legislature, and judge of the Court of Common Pleas, 1852–56; member of Congress, 1859–65, 1867–77, 1881–95, and 1897 till death; was known as "The Great Objector" and "The Watchdog of the Treasury," because he strenuously objected to what he considered extravagant appropriations.

Holmes, Augusta Mary Anne, 1847–1903; French composer; b. Paris; compositions include an opera, "Hero and Leander"; a psalm, "In Exitu Israel"; a symphony, "Orlando Furioso"; a symphony, "Lutece," which gained a prize at a competition; a symphony, "Les Argonauts"; a symphonic poem, "Irlande"; another, "Pologne"; and a symphonic ode with choruses, "Ludus pro Patria." She also wrote the text of her vocal compositions.

Holmes, Oliver Wendell, 1809–94; American physician and author; b. Cambridge, Mass.; became Prof. of Anatomy and Physiology in Dartmouth College, 1838, and in Harvard, 1847. In 1836 he published the first collected edition of his poems. In the *Atlantic Monthly* (Boston, 1857) he began a series of articles under the title of "The Autocrat of the Breakfast Table," which were followed by "The Professor at the Breakfast Table," and, 1872, by "The Poet at the Breakfast Table." As a writer of songs and lyrics, both humorous and serious, Dr. Holmes stands in the first rank. He also distinguished himself by his researches in auscultation and microscopy. In 1838 he published three "Boylston Prize Dissertations"; 1842, "Lectures on Homeopathy and its Kindred Delusions"; and, 1848, a "Report on Medical Literature." His later works include "Currents and Countercurrents in Medical Science," "Elsie Venner, a Romance of Destiny," "Songs in Many Keys," "Soundings from the Atlantic," "The Guardian Angel," "Mechanism in Thought and Morals," "Songs of Many Seasons," "A Mortal Antipathy," "One Hundred Days in Europe," "Before the Curfew," and "Over the Teacups."

Holothu'rian, one of the class *Holothuroidea*, a group of Echinoderms commonly known as "sea cucumbers," in allusion to the cucumber-shaped body. They are characterized by having the body drawn out in a wormlike manner, the mouth and vent being at opposite ends. In most forms the skin is leathery, and the calcareous plates, so characteristic of other Echinoderms, are entirely concealed in the integument. Only in a few cases do they form conspicuous plates on the outside. In many these plates are microscopic, and sometimes they are strangely regular and beautiful, forming favorite objects for microscopists. The Holothurians are without teeth, and the mud or coral sand on which they feed is forced into the mouth by means of the tentacles which surround that opening. The intestine is either straight or curiously looped within the body,

in some cases measuring forty times the length of the animal. Few species have any economic importance. In the Eastern seas certain spe-

HOLOTHURIAN (CLADODACTYLUS DOLIOLUM).

cies are taken in large quantities, dried in the sun, and sent to China, where, under the name trepang, they are used for soup.

Holofernes (hōl-ō-fér'nēz). See JUDITH.

Holst, Hans Peter, 1811–93; Danish poet and novelist; b. Copenhagen; was made famous by his "Memorial Poem on Frederick VI"; published a volume of poems, "At Home and Abroad" (prose and verse), "The Little Bugler," and a collection of war poems; also wrote several comedies and vaudevilles.

Holst, Hermann Eduard von, 1841–1904; American historian; b. Fellin, Livonia; in 1866 settled in St. Petersburg, but, having published a pamphlet displeasing to the Russian Govt., emigrated to the U. S.; was appointed professor at Strassburg Univ., 1872, and, two years later, of Modern History at Freiburg; afterwards revisited the U. S., lectured at Johns Hopkins Univ., and was Prof. of History at the Univ. of Chicago, 1892–1900; chief works, "The Constitutional and Political History of the United States," and "The Constitutional Law of the United States of America."

Holstein (hōl'stīn), duchy which forms part of the Prussian province of Schleswig-Holstein; between the Baltic and the German Ocean, and between the Elbe and the Eider, which separate it respectively from Hanover and Schleswig. The rearing of cattle and the production of butter and cheese, together with agriculture, are the main branches of industry.

Holtei (hōl'tī), **Karl von,** 1798–1880; German poet and novelist; b. Breslau; spent his life as an actor, theater secretary, manager, etc.; published dramas, including "The Old Commander," and "The Tragedy at Berlin"; novels, including "The Vagabonds" and "Noblesse Oblige," and several volumes of poems.

Holub (hō'lōp), **Émil,** 1847–1902; Austrian explorer and naturalist; b. Holitz, Bohemia; made explorations in S. Africa, 1872–79, 1883–86; made the largest collections in natural history ever brought from Africa by one explorer; published "Seven Years in South Africa," "Ornithology of South Africa," etc.

Ho'ly Alli'ance, compact entered into at Paris, September 26, 1815, by the sovereigns of Russia, Austria, and Prussia, and afterwards joined by the other European powers with the exception of Great Britain, Turkey, and the pope, and published February 2, 1816. Its design was to exclude all members of the Bonaparte family from the thrones of Europe forever; to express the intention of the contracting powers to live together in Christian harmony; and to induce the people to faithful daily fulfillment of Christian duties; but under the controlling influence of Metternich it became an instrument for the suppression of liberalism in Europe. After the Congress of Aix-la-Chapelle its policy became clearly marked, and was illustrated in the congresses of Laibach, Troppau, and Verona, which resulted in armed intervention in the affairs of Italy and Spain.

Holy Broth'erhood. See HERMANDÁD.

Holy Coat of Treves, The, garment preserved in the Cathedral of Treves, in Germany, and supposed by many Roman Catholics to be the veritable seamless garment which was worn by Christ at his crucifixion, and for which the soldiers cast lots. The church authorities of Treves maintain that it has been in their possession since the early part of the fourth century, when the Empress Helena brought it there from the East. Frequent pilgrimages are made to this shrine. Occasionally the relic is exposed.

Holy Commun'ion. See EUCHARIST.

Holy Cross, Congrega'tion of the, association of regular clerks, founded by the Abbé Moreau, 1834. Their present rule was approved, 1856, in which year the Brotherhood of St. Joseph was merged into this congregation. They were introduced into the U. S., 1842. There is a congregation of Canons Regular of the Holy Cross (anciently called Crutched Friars in England), founded 1211. They have a college at Watertown, Wis., and are numerous in continental Europe; are called Croisiers and Cross Bearers.

Holy Cross, Sis'terhood of the, association founded 1834 by the Abbé Moreau, at Mons, Belgium. The rule was approved, 1857. There are two orders of Daughters of the Cross and one of Sisters of the Cross, independent of the above.

HOLY GHOST FLOWER

Holy Ghost Flow'er, or **Dove Flower,** *Peristeria alata*, an orchidaceous plant of Central America, having white symmetrical floral envelopes, and the stamens and pistil united into a column which curi-

ously resembles a bird with expanded wings. It is venerated in its native regions as the symbol of the Holy Dove.

Holy Ghost, Or'der of the (Roman Catholic). (1) Order at first consisting of hospital knights of St. Augustine; was founded 1178 by Guido of Montpellier, and in part removed to Rome, 1204, receiving the hospital in Sassia. Here they became in part canons regular, and after many vicissitudes the knightly branch of the order ceased, 1700, to exist. In 1254 the Hospitallers of the Holy Ghost, a secular branch of the above, were organized, containing both brethren and sisters. The latter, called White Sisters, are still numerous and active. With them became connected another sisterhood of the Holy Ghost, established 1212. (2) Another congregation of canons of the Holy Ghost was confirmed, 1588. (3) Congregation of the Holy Ghost, founded by Claude Desplaces in Paris, 1703, united, 1848, with the Congregation of the Immaculate Heart of Mary, founded, 1841, by François Marie Paul Libermann. It carries on works epecially among the blacks in Africa.

Holy Grail. See SANGREAL.

Hol'yhead, seaport of N. Wales; on an island of the same name; connected with the main portion of Anglesea by a huge causeway and a bridge; 60 m. E. of Dublin. Shipbuilding and rope making are carried on. Holyhead is most notable for the breakwater by which harbor accommodation is provided for the packet service between England and Ireland, and at the same time an important harbor of refuge is constituted. Pop. (1901) 10,079.

Ho'ly In'nocents' Day. See INNOCENTS' DAY.

Holy Is'land, or **Lindisfarne',** island, 2 m. off the coast of Northumberland, England; can be reached at low tide by walking across the uncovered sands; became a bishop's see, 635, and was the episcopal seat of St. Cuthbert. Holy Island is a favorite bathing place, and its old castle and ruined abbey are interesting objects.

Holy Land. See PALESTINE.

Holy League, name applied to several alliances of European princes for war or defense. (1) That of 1511, between the pope, Julius II, Spain, and Venice, to expel the French from Italy. It lasted till the Truce of Orthes (1513). (2) That of Nuremberg (1538) between Charles V and the Catholic princes of Germany against the League of Schmalkald. (3) That of 1571, of the pope, Venice, and Spain against the Turks. (4) The league entered into, 1576, at Péronne, by the heads of the Catholic party in France, under the leadership of Guise, for resistance to the spread of Protestantism and opposition to the succession of the Calvinistic princes to the French throne. The league was anything but holy, either in purpose or in proceedings, and it led to the renewal of the bloody civil wars, which were not ended until 1590, when Henry IV of Navarre won the battle of Ivry against the forces of the league under the Duke of Mayenne. (5) That of 1609 between the pope and the Catholic states of Suabia and Bavaria. (6) That of 1684, Poland, Germany, and Venice against the Turks.

Holyoake (hŏl'yōk), **George Jacob,** 1817–1906; English social and religious reformer; b. Birmingham; after teaching, lecturing, and engaging in journalism, became one of Robert Owen's "social missionaries" at Sheffield; soon after, Owen's second lieutenant, and was the principal exponent of his movement, and its principal historian; was imprisoned for blasphemy, 1841; became active in advocating coöperation and in founding secular societies; was president of the London Secular Society until 1858; edited *The Reasoner*, and *The New Moral World*; published "History of Coöperation," "Sixty Years of an Agitator's Life," etc.

Ho'ly Of'fice. See INQUISITION.

Hol'yoke, city in Hampden Co., Mass.; on the Connecticut River; 8 m. N. of Springfield; is widely noted for its great water-power system, embracing a dam 1,000 ft. long in the river, a series of distributing canals, and powerful turbines, which supplies nearly all of its extensive mills. The distinctive industry is the manufacture of paper in many grades and forms; others are cotton and woolen goods, foundry and machine-shop products, automobiles, turbines, steam engines, carriages and wagons. The U. S. census of 1905 reported 179 factory-system manufacturing plants, operated on a capital of $37,150,103, and having a combined output valued at $30,731,332. Pop. (1905) 49,934.

Holyoke, Mt., steep, narrow ridge of greenstone trap in Hampshire Co., Mass., separating the towns of Hadley and Amherst on the N. from S. Hadley and Granby on the S.; is 7 m. long, and terminates in Belchertown on the E. Its W. extremity is separated from Mt. Tom by a cleft through which the Connecticut River flows. The highest point is 1,120 ft. above the sea.

Ho'ly Rood, or **True Cross,** the cross on which Jesus was crucified, discovered by St. Helena, mother of the Emperor Constantine, in Jerusalem, 326, or, according to Eusebius, 328, in a cave over which has since been built the Church of the Holy Sepulcher. The location of the tomb of Jesus had been traditionally identified from the earliest times. In removing the structures that had been placed over it at various times, the workmen, preparing the ground for a church to be erected by Constantine, came upon a cave in which three crosses were found lying together. The true cross was identified by the fact that its touch miraculously healed a woman who had been seriously ill for years, and raised to life a dead man, after the other two crosses had been ineffectually tried. The title of the cross of Jesus was found at the same time, and also the four nails. Two of them are said to have been used by Constantine in his bridle, and

another in the head of his statue, while the fourth, dropped by Helena into the sea on her return voyage, calmed a storm which was then raging. The story of the finding of the true cross, originally told by Eusebius, is substantiated by St. Cyril of Jerusalem, St. Ambrose, Theophanes, Nicephorus, Calixtus, Rufinius, and others, most of whom were contemporaries, and none of whom are separated by more than a generation or two from the events related.

The true cross was preserved in the church built by Constantine over the site of the holy sepulcher, which was dedicated in 335. Part of the cross, however, was sent by his mother to Constantine in Constantinople. The title was sent to Rome, and preserved there in the basilica of Santa Croce in Gerusalemme, specially erected for the purpose by Constantine in 331. This relic is still shown to the faithful on Easter Sunday. There is a good record, however, of all the churches throughout the world, more than 100 in number, in which portions of the true cross are preserved. Careful estimation of the quantity of wood shows that these are much less than the original cross of the Savior must have contained.

Ho'lyrood, Pal'ace and Ab'bey of, in Edinburgh at the E. extremity of the old town, at the foot of the Canongate. The palace is a large quadrangular building of hewn stone with a court within. It was the former residence of the kings. Charles X of France, after his flight in 1830, resided there for some time. Within the palace are the modernized royal apartments and the rooms associated with the events in the reign of Mary Queen of Scots; also a gallery containing mythical portraits of Scottish sovereigns. Adjoining the palace are the ruins of the abbey founded in 1128, which contains the ashes of numerous members of the Scotch royalty.

Ho'ly Sav'ior, Or'der of the. See BRIDGET, SAINT.

Holy Sep'ulcher, tomb in which Christ lay. It was hewn out of a rock in a garden in the place of the crucifixion, just outside the walls of Jerusalem. In the opinion of many the spot has not yet been identified, and never will be. The traditional site, fixed upon early in the fourth century, is a cave now inclosed in marble within the pile of buildings known as the Church of the Holy Sepulcher. The edifice contains chapels for Greeks, Latins, and Armenians, with smaller apartments for Copts, Jacobites, and Maronites.

Holy Sepulcher, Or'der of the, (1) CANONS REGULAR AND CANONESSES OF (Augustinian), founded at Jerusalem, 1099 or 1114. They spread throughout Europe. The canons ceased to exist in the seventeenth century, but there are still nuns who live in seclusion and instruct children. (2) KNIGHTS OF THE HOLY SEPULCHER, perhaps founded by Alexander III, and still found in small numbers. They are appointed by the pope as guardian father, and by the Patriarch of Jerusalem. The Latin Patriarch of Jerusalem is grand master. An order of this name existed in England from 1174 to the seventeenth century. The Franciscans once had the sole right to confer this rank.

Holy Spir'it Plant. See HOLY GHOST FLOWER.

Holy Thurs'day. See ASCENSION DAY.

Holy Wa'ter, in the Greek, Roman Catholic, and the various Oriental churches, water which has been blessed by a priest, and is used in religious ceremonies. Its use in churches is very ancient, and it is by many believed to be derived from a custom of the ancient Hebrews.

Holy Week, last seven days of Lent, the week before Easter, popularly known in continental Europe as *Still Week*—often called *Passion Week*, but that name is also given to the week preceding it; contains Palm Sunday, Spy Wednesday, Maundy or Holy Thursday, Good Friday, and Holy Saturday; is a penitential season, in commemoration of Christ's passion and death.

Hol'ywell, town of Flintshire, N. Wales; 15 m. NW. of Chester; received its name from the well of St. Winifred, which is said to be the most copious spring in Great Britain. In its vicinity are found the richest coal, lead, and copper mines in the kingdom, and, besides its manufacture of cotton and flannel, Holywell has many establishments for lead and copper smelting. Pop. (1901) 2,652.

Homburg (hōm'bōrkh), town of central Germany; capital of the former landgraviate of Hesse-Homburg; 8 m. NNW. of Frankfort on the Main; is famous for its mineral springs and elegant bathing establishments, which, before the closing of the gambling saloons, 1872, attracted more than 10,000 visitors annually. On a neighboring hill stands the castle of the former landgraves, built in 1680, and afterwards several times enlarged. Pop. (1900) 9,635.

Home, Daniel Dunglas, 1833–86; Scottish spiritualist; b. near Edinburgh; was adopted by an aunt who took him to the U. S., and became distinguished as a spiritualistic medium; resided mainly in Europe after 1855; became secretary of The Spiritual Athenæum, London, 1866; published "Lights and Shadows of Spiritualism"; also two volumes of an autobiographical character.

Home, Henry. See KAMES, HENRY HOME.

Home, or Hume, John, 1722–1808; Scottish dramatist; b. Ancrum; fought on the Hanoverian side in the rebellion of 1735; was appointed minister at Athelstaneford, 1746. In 1756 his tragedy of "Douglas" was produced at Edinburgh with great success, but the circumstance that it was written by a clergyman caused such a scandal that Home resigned his office, 1757. George III gave him a pension and a sinecure office, and he continued to write tragedies—"Alonzo," "Alfred," etc.; also wrote a "History of the Rebellion of 1745."

Homel (hō-mĕl'), town of Russia; government of Mohileff; 132 m. S. of Mohileff; on

the Sosh, an affluent of the Dnieper; has important sugar refineries, and carries on a brisk trade in the agricultural products of the surrounding country. Pop. (1897) 36,846.

Homeop'athy, system of therapeutics founded on the principle that "like cures like," that is to say, that a drug is capable of removing morbid conditions, naturally existing, which are similar to those it is capable of producing. This principle or law in therapeutics was first announced by Hippocrates long before the Christian era as one of the methods of applying drugs for removing disease, but owing to the fact that the knowledge of what drugs were capable of producing was extremely limited, and also that Hippocrates made no effort to increase his knowledge in that direction, the application of the law soon fell into disuse. It was rediscovered and announced by Hahnemann, 1796, in Hufeland's *Journal*, in a paper entitled "An Attempt to Find a New Principle for the Discovery of the Healing Power of Medicines." Hahnemann collected and arranged all that was known concerning the positive effects of drugs on the healthy, and also made extensive investigations into the properties of new drugs by experimenting with them on himself, his family, and his friends. Hahnemann discovered, proved, and applied as many as ninety-six remedies. This number has been steadily increased by his followers, and now as many as nine hundred remedies are "booked."

The principles of homeopathy would be inapplicable without a knowledge of drug effects upon the healthy, and at first a record of all cases of poisoning was made, and this was supplemented by experiments. Thus it is noticed that aconite produces a well-marked faceache (tic douloureux), and hence, according to homeopathic principles, will cure it, provided the pain be similar to that produced by aconite, as the disease will be supplanted by a passing drug effect and the patient cured. It is necessary to avoid producing in the sick new effects of the drug, or adding to the violence of the disease, and it is found that incredibly minute quantities of drugs are capable of obliterating the symptoms of a patient, the more so as diseased organs are more sensitive than healthy organs to drugs which act directly upon them. See ALLOPATHY; MEDICINE.

Ho'mer, earliest of all Greek poets whose works were known in the classical period, and acknowledged in modern times to be the chief of all epic poets; birthplace unknown, though more than seven cities, including Smyrna, Rhodes, and Athens, claimed him; by Herodotus was thought to have lived abt. 850 B.C., while others placed him abt. 750 B.C. Until the nineteenth century he was regarded as the author of the "Iliad" (The Poem of Ilium), and the "Odyssey" (The Poem of Odysseus), each of which is divided into twenty-four books. These are now believed to be of composite authorship, but a certain unity exists, which is due to some poet who, for convenience, may be called Homer. The testimony of archæology favors the view that the poems were composed perhaps eight or nine centuries B.C., although they may not have been in their present form before 700 B.C. Some of the ancients ascribed to Homer "The Battle of the Frogs and Mice" (Batrachomyomachia), several poems, and a collection of thirty-four so-called hymns.

Home Rule, in general, the control of its own affairs by a political division; specifically, the principle on which a strong party in British politics desires to fix the governmental relations of Ireland to Great Britain. The movement for home rule is the most recent form in which the Irish political consciousness has formulated its protest against the union of Great Britain and Ireland, effected by Pitt, 1800. The formal beginning of the home-rule movement dates from May 19, 1870, when an association was formed in Dublin for the purpose of obtaining for Ireland the right and privilege of managing her own affairs by a national parliament, whose competence should include all matters relating to her internal affairs, and control over Irish resources and revenues, subject to the obligation of paying a just proportion of the imperial expenditure. A reorganization was effected 1873, and the name was changed to the Home Rule League. In the general elections of 1874 Charles Stewart Parnell became the leader of the movement, and radicalized it and the party by putting himself at the head of the Irish Land League, 1879. In 1882 the Irish National League was formed. In 1885 the Nationalists united with the Conservatives in overthrowing the Gladstone government, and in the ensuing elections secured 85 out of the 103 Irish seats and one from England, thus obtaining the balance of power in the House of Commons. In 1886 Mr. Gladstone introduced a home-rule bill, providing for a legislative body to sit at Dublin and to exercise the law-making power for Ireland over all subjects save those especially reserved for the imperial Parliament, but this was defeated. Meantime, 1891, those opposed to Parnell as a leader had seceded from the National League, and formed the National Federation. In 1893 Gladstone introduced his second bill, providing for a legislative body of two houses, the members of the upper to be chosen by electors having a property qualification, giving complete self-government in local matters, decreasing the Irish representation in the House of Commons, and withholding from the Irish members the right to vote on cabinet questions. This passed the Commons, but was defeated by the House of Lords. In 1898 an act providing for free local government for Ireland passed both houses.

Home'stead, borough in Allegheny Co., Pa.; on the Monongahela River, 8 m. SE. of Pittsburgh; contains one of the largest steel-manufacturing plants in the U. S.; also has manufactures of glass and firebrick. In July, 1892, the borough was a scene of a serious labor disturbance, which necessitated the calling out of the National Guard of the state. Pop. (1900) 12,554.

Homestead Laws, in the U. S., legislation enacted to secure to some extent the enjoy-

ment of a home and shelter for a family or individual by exempting, under certain conditions, the residence occupied by the family or individual from liability to be sold for the payment of the debts of its owner, and by restricting his right of free alienation. The word homestead in ordinary usage signifies simply the place where the family resides and has its home, but in legal language the word has the special signification of the family residence owned and occupied in compliance with certain statutory regulations, by operation of which the owner's right of alienation is subjected to certain restraints, and the property is protected by certain exemptions from being sold upon judgment and execution. Nearly all of the states and territories have passed homestead laws, which vary one from the other in many of their provisions, but with a few exceptions they have certain characteristics in common.

The laws of the states provide in general that a homestead exemption may be claimed by a husband or other head of a family (and in some states a widow, or, under certain circumstances, a wife) by claiming the right according to the methods prescribed by statute —that is, generally by placing on record a written declaration of the claim. The homestead must be owned and occupied by the claimant, and may be held either by freehold, leasehold, or equitable title only. A temporary absence, with intent to return, will not take away the homestead exemption right where it is made dependent on occupation. In the case of the exemption being claimed by a married person, it can be alienated or incumbered only by the joint deed or consent of husband and wife, and after the death of the owner, leaving minor children surviving, the alienation or incumbrance is absolutely restricted during the minority of the children.

The homestead property remains liable without exceptions for purchase-money debt; for state, county, city, and school taxes; and generally for mechanics' laborers', and material men's liens, for improvements thereon, and (with more numerous exceptions) for other liens by laborers or mechanics, for fiduciary obligations of an officer, guardian, or trustee, and for a tort of the owner or wife. The amount of property exempted varies in rural land from 40 to 200 acres; in land in a city, town, or village, from one lot to an acre, and in the case of one state, five acres in small towns; it varies in money value from $500 to $5,000. In addition to these state laws the Federal homestead laws have parceled out nearly 90,000,000 acres to homestead settlers. These allotments were made to any citizen or person having declared his intention of becoming a citizen, and being twenty-one, or the head of a family. The homesteads were of 160 acres, or less, and full title was given after five years' residence and cultivation. Ex-soldiers and their heirs were given a preference. The land was practically given free, the only payment required being fees amounting to about $25.

Hom'icide, the killing of one human being by another. The word "homicide" comprehends every human act, whether innocent or criminal, having human death as its result. Homicide, at common law, is divided into three classes—justifiable, excusable, and felonious. From the first the second is distinguished as involving some measure of guilt, justifiable being entirely guiltless. But this distinction was practically obliterated when, at an early period, the penalty for excusable homicide, *viz.*, forfeiture of goods, ceased to be enforced. In legal theory, however, a distinction is still made, and it is convenient to treat defensible homicide under the two heads.

I. *Justifiable Homicide* is of four kinds. (1) Where the proper officer executes a criminal in strict conformity with his sentence. Such an act is, of course, obligatory upon the officer as a legal duty. He must, however, follow the sentence precisely, otherwise the act may amount to murder. (2) Where an officer of justice (or a person acting in his aid), in the proper performance of a legal act, obligatory upon him, kills a person who resists or prevents him from executing it. (3) Where the prevention of an atrocious crime renders the homicide necessary. Whenever any offense of a felonious nature is attempted, such as murder, robbery, burglary, arson, rape, etc., either the person whose life or property is endangered, or anyone who has knowledge of the intended crime, may use every effort to prevent its commission, and causing the death of the offender is justifiable if the imminent danger cannot otherwise be averted. Nor is it essential to his justification to show that the crime would actually have been perpetrated if the act of homicide had not been performed. For a person under such circumstances is warranted in acting upon a natural and reasonable presumption. (4) Killing of the enemy during time of war in the actual prosecution of hostilities is, of course, justifiable, on the ground of military necessity.

II. *Excusable Homicide is of two kinds.* (1) By misadventure or accident. Such homicide is innocent only when the person committing it is engaged in a lawful act, without intention of inflicting injury upon another, and without any failure to use proper precautions to prevent danger. If the act is unlawful, the homicide will be felonious. The lawful act resulting in death may be the administering of reasonable correction by a parent or school teacher, or other person occupying a position of similar authority. But the homicide is only innocent in such a case when the severity of the punishment is kept within due bounds. In like manner, if by some mischance one of several persons engaged amicably in athletic sports should be killed, he who occasioned the death would be innocent. (2) Homicide in self-defense, or in protection of one's property, or wife, child, parent, or servant. Under this head are not included cases of defense against felonious crimes, such acts of defense being justifiable, but only against any other modes of attack or injury which may be attempted, as in cases of common assault or trespass, where there is no intention to commit a felony. The distinction is important, on account of the larger legal obligation imposed, in this lat-

ter class of defensive acts, upon the person against whom an offense is perpetrated, to seek to avoid committing homicide. When any felony is attempted, the person whose life or property is endangered is under no obligation to seek to avoid the threatened injury by using every peaceable means, but when the attempted injury is not felonious, homicide must not be committed unless all other available means are first adopted and fail. Therefore, in case of simple assault, though the person assailed may protect himself by blows, he must "retreat to the wall," or forbear as long as is consistent with safety, before he ventures to kill his assailant.

In the defense of property, retreat is not necessary in order that the homicide may be excused (or justified), since that would be yielding the property without attempting protection; but the wrongdoer must first be requested to depart or to refrain from interfering with goods before force is applied, and even then the trespasser must not be killed or maimed unless his persistence makes such action necessary. In the U. S. crimes are generally defined by statute, and the principles relating to homicide have thus received various, but rarely substantial, modifications.

For felonious homicide, see MANSLAUGHTER; MURDER.

Homilet'ics, science which treats of the structure, composition, and delivery of a sermon. The word homiletics was first used in the latter half of the seventeenth century. For a long while it was considered as the synonym of "sacred rhetoric." Homiletics presupposes both logic and rhetoric, and builds its system on them, applying their principles to the work of the Christian pulpit. The sermon is distinguished from all other orations both by its subject and its object; it finds its motive, its authority, its materials, and its end in the Word of God; it speaks of and for God to men; and it aims to bring men to God in faith and love and service.

Hom'ily, familiar and informal discourse. It is impossible to discriminate sharply between the homily and the sermon on the ground of their intrinsic qualities. It is customary to say that the homily is a more familiar and informal discourse than the sermon. One of the early provincial councils in the sixth century enjoined that "if for any reason the presbyter could not preach, the deacons should read 'homilies of the holy fathers.'" The homilies were arranged according to the festivals and seasons of the ecclesiastical year, and the passage for the day was called a *pericope*, or section. Hence the use of homilies in the churches came to be known as the "pericopic system." Each homily began with the words "Post illa verba textus" (after these words of the text), and so these homilies were popularly known as "postils." Hence in the Latin of the Middle Age *postillare* meant to preach or to read a homily. In the reign of Edward VI, what is known in England as the "First Book of Homilies" was prepared and published, 1547, under the direction of Cranmer. Under Elizabeth, 1563, the "Second Book of Homilies" was edited by Jewell. In both of these volumes various preachers are represented. These homilies were designed for the use of the inferior clergy who were not qualified to make sermons; the language of the article which enjoined their use requires that they may be read in churches by the ministers, diligently and distinctly, that they may be "understanded of the people."

Homs (hōms), or **Hums** (hūms), the *Emesa* of Strabo and Pliny; town of Syria, in the valley of the Orontes; 1 m. E. of the river and about 86 m. NE. of Damascus; became a Roman colony under Caracalla, 211–217 A.D., and was noted for its splendid Temple of the Sun. Here Zenobia, Queen of Palmyra, was defeated by the Emperor Aurelian, 273 A.D. The modern town is a place of considerable trade, and has a population of about 30,000.

Hon'da, city of Colombia, department of Tolima; on the Magdalena; 700 ft. above the sea; is the principal river port of the Magdalena and of the republic, and the center of a large portion of the trade with the interior. Steamers load and unload at Caracoli, just below.

Hon'do. See JAPAN.

Hondt (hōnt), name of a celebrated family of Flemish engravers. JOSSE HONDT (1546–1611), the founder of the family, spent a large part of his time in England, and was celebrated as an engraver of maps. HENRY DE HONDT, THE ELDER (1573–1610), executed a series of 144 portraits of artists, mostly Flemish, and of Melanchthon, Bugenhagen, Wyclif, Savonarola, Calvin, and Knox. HENRY DE HONDT, THE YOUNGER (1581–1650), engraved portraits of Queen Elizabeth and William of Orange, and a view of The Hague. ABRAHAM HONDT (1638–91) was celebrated not only as an engraver, but also as a painter of animals.

Honduras (hŏn-dō'răs), republic of Central America; bounded N. and NE. by the Caribbean Sea, SE. by Nicaragua, SW. by the Bay of Fonseca and Salvador, NW. by Guatemala; area, 46,250 sq. m.; pop. (1905) 500,136; capital, Tegucigalpa. Honduras consists essentially of a central plateau. It lies to the E. of the main Cordillera, and averages about 3,000 ft. in height. The Cordillera proper runs on the whole parallel to the Pacific coast, at a distance of about 50 m., but does not exceed 10,000 ft., is serpentine, and at Comayagua, near the center of the republic, is broken by a plain from 5 to 15 m. broad and about 40 m. long, called the plain of Comayagua. The only volcanoes are on the islands in the Bay of Fonseca. From the Cordillera low ranges of mountains extend irregularly, especially toward the NE. The principal river, and the largest in Central America, is the one forming the SE. boundary, called the Wanks in English, but also given the name of Segovia, Coco, and Yoro. It is 400 m. long. Next in size is the Ulua, near the N. boundary. Parallel to it, and for much of its course only a few

miles distant and in the same valley, is the Chamelicon or Chamelecon.

Puerto Cortez is the principal port on the N. coast, and is the terminus of the railway to San Pedro; it is only an open roadstead. Along the coast is a chain of islands (the Bay Islands), 20 or 30 m. distant, and at the edge of deep water. This republic owns several islands in the Bay of Fonseca. The most important is Tigre, on which is Amapala, the best port of Honduras. Columbus discovered Honduras 1502, but as he was too ill to land, his brother Bartholomew acted in his stead, and on Sunday, August 15th, mass was celebrated on shore. Conquest of the interior was begun 1535, and pushed with such vigor that in a score of years it is said that a quarter of the Indian population (estimated in all at 400,000) had perished. Few events of importance mark the history of the province till the declaration of independence, 1821. By the Treaty of Amapala, June 20, 1895, Honduras united with Nicaragua and Salvador to form a Greater Central American Republic, with a Federal Diet dealing solely with their foreign relations, but this was soon dissolved. The country is subject to revolutions and to quarrels with its sister republics, one of which, with Guatemala, occurred 1906.

Honduras, Bay of, inlet of the NW. part of the Caribbean Sea; bordered by the shores of Yucatan, Belize, Guatemala, and Honduras, which together form nearly a right angle. Several lesser inlets open into it, the largest being the Gulf of Amatique at the point of the angle, in Guatemala, and the deep Bay of Chetumal, between Belize and Yucatan. There are numerous islands and keys along the shores, the most important being the Bay Islands (Ruatan and others) off Honduras, and Turneffe, off Belize. The Motagua, Belize, and numerous smaller rivers empty into the Bay of Honduras.

Honduras, Brit'ish, or Belize (bĕl-ēz'), British colony in N. Central America; bounded N. by the Bay of Chetumal and Yucatan, W. and S. by the republics of Mexico and Guatemala, and E. by the Caribbean Sea. To the E. it embraces the numerous islands and reefs in Honduras Bay. The Sarstoon River, which flows into the Bay of Honduras, divides the colony on its S. side from Guatemala. Its greatest length from N. to S. is 180 m.; extreme breadth, 57 m.; area, approximately 8,000 sq. m.; pop. (1906) 41,007; capital, Belize. The land is very low on the coast and in the N., but rises inland to the Sand Ridge, or "Cahune Ride," named from the cahune palm which grows there. The W. part is but little explored. The highest known points are in the Cockscomb Mountains, near the center of the colony, where there are elevations about 4,000 ft. in height. The country is well watered, and the Belize River is navigable for 175 m. Little is known of the early settlement of this coast. It seems to have been resorted to occasionally by wood cutters in the sixteenth century. Some British subjects, attracted by the abundance and excellence of the mahogany and logwood, went from Jamaica and made the first permanent settlement. Many attempts were made by the Spaniards to drive out the colonists, the last 1798. British Honduras was raised to the rank of a crown colony, 1862. It is principally noted for its production of mahogany and logwood.

Hone, William, 1780–1842; English clergyman and author; b. Bath. In 1817 he made a great hit by his pamphlets, illustrated by Cruikshank. One of them, a parody on the "Book of Common Prayer," brought him before the courts, 1817. He became, after 1830, a preacher to a congregation of Dissenters. Among his writings are "The Political House that Jack Built," "A Slap at Slop," "Apocryphal New Testament," "Ancient Mysteries Described, Especially the English Miracle Plays."

Hone, stone of fine grain, used for giving a fine edge to steel blades. Hones are usually of much finer grain than ordinary whetstones and grindstones. They are made of several kinds of stone. Various green stones, siliceo-argillaceous slates, etc., are used. One of the very best hone stones used is the novaculite of Arkansas, of Carboniferous age. There are also excellent oil stones from Turkey, Austria, Siberia, England, Wales, and Scotland. For many purposes the stone from Turkey is considered the best.

Hon'ey, saccharine material collected from flowers by several kinds of insects for the food of themselves and progeny, especially by the honey bee (see BEE). In bee honey there have been reported as present three kinds of sugar: common cane sugar, or sucrose; dextrose, and lævulose, the last two being the chief constituents. Honey varies in color, aroma, and flavor with the flowers from which it has been collected, clover honey, buckwheat honey, and wild honey being distinguishable in this respect; and some cases are on record of poisonous qualities derived from the like source. Honey may be adulterated with glycerin and glucose, and even imitated as a whole by combining the latter product with other materials and flavoring with appropriate essential oils, but no process has been devised to make even a passable imitation of honey in the comb.

Honey Buz'zard, name given in England to *Pernis apivorus*, a chiefly insectivorous bird of the falcon family, differing from other birds of the family in its food and in having the space between its eyes and bill completely feathered. *P. cristatus*, the crested honey buzzard, is an Asiatic bird. Bees, wasps, and honey are sought by it.

Hon'eycomb Moth, or Bee Moth, small lepidopterous insect (*Galleria cereana* and *G. alvearia*), of the snout moth family. The larvæ spin silken galleries in beehives, running between the layers of honeycomb, on which the young insects feed. The moth lays her eggs at evening, while the bees are at rest, and is a most formidable enemy to them.

Hon'eydew, sweet liquid found in drops on the leaves of various plants. It is sometimes an exudation from the plant itself, sometimes a secretion of aphids which infest the plant.

Hon'ey Guide, name given to several small birds of the genus *Indicator* from their curious habit of guiding hunters to the hives of wild bees. There are about a dozen species,

HONEY GUIDE.

mostly African, although some occur in Asia and Borneo. The honey guides are related to the cuckoos, and like them deposit their eggs in the nests of other birds.

Honey Lo'cust, popular name of the *Gleditschia triacanthos*, a large and well-known leguminous tree of the U. S. It takes its

HONEY LOCUST.

name from a sweet substance, with which its long pods are filled when ripe. The tree has stout, often triple thorns, and is used as a hedge plant.

Hon'eysuckle, popular name of many shrubs, erect or twining, of the genera *Lonicera*, *Diervilla*, etc., and of the family *Caprifoliaceæ*. The U. S. have several species, a few of which are seen in cultivation. Most of the finest ones are from N. Asia or Europe. They have been much improved by cultivation. Many

TRUMPET HONEYSUCKLE.

other plants, azaleas, aquilegias, etc., are locally known as honeysuckles.

Honfleur (ôn-flêr'), town of France; department of Calvados, on the Seine; 7 m. SE. of Havre; is chiefly engaged in fisheries, and carries on a brisk trade, exporting eggs, butter, cattle, grain, and fruits to the United Kingdom. It was long in possession of the English, and figures largely in their French wars.

Hongkong (hŏng-kŏng') (the local pronunciation of Chinese HIANG-K'IANG, fragrant streams), island belonging to Great Britain; off the coast of China, in the mouth of the Chu-kiang, or Pearl River; 90 m. S. of Canton. The island is separated from the mainland of China by a narrow passage called Lyeemoon, or Carpfishgate; greatest length, about 11 m.; breadth, a little over 4 m.; area, 29 sq. m. In 1898 China leased to Great Britain for ninety-nine years a portion of territory including the port of Kowloon and land further inland, together with the waters of Mirs Bay and Deep Bay, and the island of Lantas—total area, 376 sq. m., pop. (1906) excluding the new territory beyond the boundary of Kowloon, 319,803.

Hongkong is rocky and bare, and consists of a ridge of barren granitic hills, intersected by numerous deep and narrow, but fertile, valleys, through which flow never-failing streams of water. The highest peak, on the N. slope of which stands the city of Victoria, is 1,825 ft. The coasts are in the main steep and rocky, but are broken, especially on the S. side, by numerous deep inlets, the chief of which are Deep Bay and Tai-tam Bay.

The principal center of population is the city of Victoria, which stretches for nearly 4 m. along the N. coast, opposite the peninsula of Kowloon, 459 m. of which now form part of the colony, having been ceded to Great Britain, 1861. Aside from numerous small native establishments for the making of lanterns, um-

brellas, leather boxes, toys, preserved ginger, etc., and rattan, bamboo, gold and silver, and other wares, Hongkong has sugar refineries, tanneries, distilleries, a ropework, foundries, more than one hundred granite quarries, cotton mills, and cement works. Hongkong is the great distributing center of the Far East and the commercial clearing-house of China. It is a free port, and has no customhouse. The trade is chiefly with Great Britain and her colonies and dependencies, China, Japan, and the U. S. Hongkong was ceded to Great Britain 1841, and was erected into a colony 1843.

Honolulu (hō-nō-lō'lō), capital of the Territory of Hawaii; on the S. side of the island of Oahu. Its harbor is formed by a deep and spacious basin in the coral reef which surrounds the island. It is safe at all seasons, and lined with substantial and commodious wharves. There is regular steamship communication with Seattle, Tacoma, San Francisco, Vancouver, Victoria, Sydney, and other ports. The city itself is situated among beautiful tropical surroundings, and has an equable and healthful climate. Among its public buildings the most remarkable are the former palace, the Parliament house, the Roman Catholic Cathedral, the treasury, the post office, the Bishop Museum containing the feather cloaks of Kamehameha I, valued at $150,000, etc. It has hospitals, public library, theater, printing establishments, bank, manufactories of carriages, iron, etc, and its trade is considerable. Pop. (1900) 39,306.

Hono'ria, Justa Grata, b. 417 at Ravenna; Roman princess; daughter of Constantius II and Galla Placidia, and a sister to Valentinian III; lived after the death of Honorius, 423, and the usurpation of Joannes in Rome, at the court of Valentinian III. She caused an invasion of Roman territory by her invitation to Attila to come to Rome and claim her as his bride.

Hono'rius, 384–423; Roman emperor; b. Constantinople; at the age of eleven, on the death of his father, Theodosius the Great, received the W. part of the Roman Empire—Italy, Africa, Spain, Gaul, Brittany, and Illyria—with Ravenna for his residence, his brother Arcadius receiving the E. part; was placed under the guardianship of Stilicho, on whose death, 408, the barbarians invaded Gaul, Africa made itself independent, and Italy was thrice plundered. The weak and indolent emperor could do nothing, and Constantius, who succeeded Stilicho and made some successful resistance to the barbarians, was, 420, raised to the rank of joint emperor with Honorius.

Honorius, name of four popes, who follow: HONORIUS I, d. 638; b. Campania; succeeded Boniface V, 625; was anathematized by the Council of Constantinople for assenting to the Monothelite heresy, 680. HONORIUS II (LAMBERT DI FAGUANO), d. 1130; succeeded Calixtus II, 1124; Thibauld at same time was elected pope by an opposition party, but resigned claim; Honorius concluded the Concordat of Worms and confirmed the Order of the Templars. HONORIUS III (CENCIO SAVELLI), d. 1227; b. Rome; succeeded Innocent III, 1216; confirmed the orders of the Dominicans and Franciscans; had a much disturbed pontificate; succeeded by Gregory IX. HONORIUS IV (GIACOMO SAVELLI), d. 1287; b. Rome; succeeded Martin IV, 1285.

Hon'ors of War, stipulated terms granted to a vanquished enemy, by which he is permitted to march out of a town, from a camp, or line of intrenchments with all the insignia of military etiquette. Most everything depends on the general granting the capitulation. In some cases the troops of a besieged garrison are permitted to march out with drums beating, colors flying, etc.; in others they are required to lay down their arms at a named spot, and then depart; while in still other cases they are required to march back to their works, after having been permitted to march out either silently or with drums beating, and pile their arms in front of their works.

Hontheim (hōnt'hīm), **Johann Nicolaus von,** 1701–90; German jurist and prelate; b. Treves; became Prof. of Civil Law at Treves, 1732, and, 1748, Bishop of Myriophis *in partibus*, and Suffragan of the See of Treves; most famous work, "De Statu Ecclesiæ et Legitima Potestate Romani Pontificis," published under the pseudonym of JUSTINUS FEBRONIUS, in which he took ultra-Gallician or national views, and propounded a system called Febronianism. It was condemned by Clement XIII. His doctrines were revived in the Old Catholic movement.

Honthorst (hōnt'hōrst), **Gerard van,** 1592–1660; Dutch painter; b. at Utrecht, Holland; commonly called GHERARDO DELLA NOTTE, because after his sojourn in Rome, where he was much impressed by Raphael's "Deliverance of Peter," he painted numerous pictures representing interiors lighted up by lamps or candles; had many commissions in Rome, then went to England, where he painted several pictures, including portraits, for the king; also visited several German courts, but settled finally in Ghent as painter in ordinary to the Prince of Orange, for whom his chief work was executed. Died at Utrecht.

Hooch (hōch), **Pieter de,** called also DE HOOGH and DE HOOGE; abt. 1632–80; Dutch painter; b. Rotterdam; settled in Delft. His favorite subjects are interiors with several figures, and he is perhaps unequaled in these. He painted portraits as well. Among his famous works are, in the National Gallery, London, "A Dutch Courtyard" and "A Dutch Interior," the latter being the important picture called by the French "Une Chanson Joyeuse"; in the Louvre, "Interior of a Dutch House" and "The Card Players."

Hood, name of two noted English admirals, sons of a rector of Bath, England. The elder brother, SAMUEL, 1724–1816, became admiral, 1780; Irish baron, 1782; English viscount, 1796; fought with great valor against the

French during the American War of Independence, and again in the war of 1793, when he commanded in the Mediterranean, took Toulon —which, however, he had to give up again— and expelled the French from Corsica. The younger brother, ALEXANDER, 1727–1814, became admiral, 1782; Irish baron, 1794; British peer, 1796; viscount, 1800. He commanded under Lord Howe at Gibraltar and in the Channel, 1794, and gained, 1795, a victory over a French fleet off Lorient.

Hood, John Bell, 1831–79; U. S. military officer; b. Owingsville, Ky.; graduated at West Point, 1853; was actively engaged on frontier duty until 1861, when he entered the Confederate army; served through the Virginia Peninsular campaign, at the second battle of Bull Run, Antietam, Gettysburg, and Chickamauga (where he lost a leg); in 1864, with rank of lieutenant general, succeeded Gen. Johnston in command of the army resisting Gen. Sherman's invasion of Georgia; was defeated by Schofield at Franklin and by Thomas near Nashville; soon after was relieved by Gen. Richard Taylor.

Hood, Robin, outlaw; traditional hero of many English ballads; first mentioned abt. 1377; is represented as living chiefly in Sherwood Forest and Barnsdale, Yorkshire; ruled as chieftain over a band, of whom Little John, Friar Tuck, Alan-a-Dale, and Maid Marian were members; lived by the king's deer, and by levies upon the purses of travelers; in the best ballads is generous, bold, humorous, and full of a rugged nobility. He is very pious, loves the king, will harm no company "that any woman is in," and takes only from the rich to give to the poor. His end is ascribed to a prioress, a relative, to whom he goes in a fit of illness, and who treacherously causes him to bleed to death. Writers have often tried in vain to show that Robin was an actual outlaw living in the time of Edward II.

Hood, Thomas, 1798–1845; English humorist; b. London; became subeditor of the *London Magazine*, 1821; edited *The Comic Annual*, 1829–38; began the publication of a monthly, *Hood's Own*, 1838; lived on the Continent, 1835–40; subsequently edited *The New Monthly Magazine* and *Hood's Magazine*; works include "Odes and Addresses" (with J. H. Reynolds), "Whims and Oddities," "Plea of the Midsummer Fairies," "Hero and Leander," and "Tylney Hall," a novel; best-known poems: "Eugene Aram's Dream," "The Song of a Shirt," and "The Bridge of Sighs."

Hood, Mt., volcanic peak, bordering the Cascade Range, Wasco Co., Ore.; nearly 12,000 ft. high; apparently long extinct, though reported in activity as late as 1875; has celebrated precipices and gives origin to several glaciers.

Hood'ed Seal, large seal (*Cystophora cristata*) found on both sides of the N. Atlantic, so named because the males can inflate the skin on the upper part of the nose into a hood or crest. The adults are about 7 or 8 ft. long. These seals are hunted for their hides and oil, and form a part of the catch of the Newfoundland sealing fleet. This species is familiarly known among the sealers as the bladder nose.

HOODED SEAL.

Hooft (hōft), **Pieter Cornelissen,** 1581–1647; Dutch poet and historian; b. Amsterdam; became, 1609, high bailiff of Muiden and warden of Goviland; works include a "Life of Henry IV of France," "History of the Netherlands," the tragedies "Achilles and Polyxena" and "Theseus and Ariadne," and the pastoral play "Granida."

Hooghly (hō'glē). See HUGLI.

Hook, Theodore Edward, 1788–1841; English humorist; b. London; by reason of his bold practical jokes, his brilliant conversational powers, his talent for punning and improvisation, became a favorite in aristocratic society and the friend of the prince regent, who, 1812, secured for him the appointment of accountant general and treasurer of Mauritius. He was returned to England under arrest, 1818, irregularities having been discovered in his accounts, but, no grounds for a criminal charge existing, was soon liberated. In 1820 he assumed the editorship of a new journal, *John Bull*. He was again arrested, 1823, the board of audit having declared him a debtor to the Crown, and was confined for nearly two years. Author of "The Soldier's Return," a comic opera, "Sayings and Doings," "The Parson's Daughter," etc.

Hooke, Robert, 1635–1703; English natural philosopher; b. Freshwater, Isle of Wight; in 1664 became Prof. of Geometry at Gresham College, London; in 1666 was appointed city surveyor; in 1677 was made secretary of the Royal Society. He accused Huyghens of having stolen his invention of regulating the balance of a watch by a spiral spring, and laid claim to the first discovery of the principle of gravitation against Newton.

Hook'er, Joseph, 1814–79; U. S. military officer; graduated at West Point, 1837; served in Florida against the Seminoles and in the Mexican War with especial honor, but resigned, 1853. On the outbreak of the Civil War was appointed brigadier general of volunteers; in command of the First Corps displayed great

bravery at South Mountain and Antietam; in January, 1863, succeeded Burnside in command of the Army of the Potomac, and fought the battle of Chancellorsville. At the time of the invasion of Pennsylvania by the Confederate army, the Army of the Potomac, following, had reached the vicinity of Frederick, Md., when, owing to the refusal of Gen. Halleck to place the troops at Harper's Ferry at the disposal of Hooker, the latter was, at his own request, relieved from command of the army, June 28th. In September, 1863, he was assigned to the command of the Twentieth Army Corps (Army of the Cumberland), and was distinguished at the capture of Lookout Mountain, battle of Missionary Ridge, pursuit of the Confederate army, and the action of Ringgold. In the invasion of Georgia by Sherman, Hooker led his corps in the almost constant fighting up to and including the siege of Atlanta; was brevetted major general U. S. A., for gallantry at Chattanooga, and, 1868, retired on full rank of major general.

Hooker, Richard, 1554–1600; English theologian; b. Heavitree, near Exeter; became successively vicar in Drayton-Beauchamp, 1584; Master of the Temple, London, 1585; rector of Boscombe, 1591, and of Bishopsbourne, 1595. His colleague in the Temple church was Travers, a zealous Puritan, and between him and Hooker a sharp controversy arose, which occasioned the famous work of the latter, the "Laws of Ecclesiastical Polity," a defense of the Church of England and Church establishments in general.

Hooker, Thomas, abt. 1586–1647; American clergyman; b. Markfield, Leicester; preached in London, but, persecuted for nonconformity, took refuge in Holland and preached at Delft and Rotterdam; emigrated, 1633, to New England, and settled at Newtown (now Cambridge), Mass., whence, 1636 he removed with his congregation to the present Hartford, Conn.; before the first meeting of the General Court of Connecticut preached a sermon, the democratic ideas of which were embodied in the first written constitution known to history; with John Cotton wrote "A Survey of the Summe of Church Discipline."

Hoop Ash. See HACKBERRY.

Hoop'er, John, abt. 1495–1555; English prelate and martyr; b. Somersetshire; having adopted the views of the German Reformers, was compelled to leave Oxford, and went to Switzerland; on the accession of Edward VI returned to England; preached with great success in London, and was, 1550, appointed Bishop of Gloucester. In the beginning of the reign of Mary, 1553, he was imprisoned, and as he refused to retract, he was condemned as a heretic, and burned at the stake at Gloucester.

Hooper, William, 1742–90; American lawyer; b. Boston, Mass.; removed, 1767, to N. Carolina, where he held many important public positions, serving in Congress, 1774–77; signed the Declaration of Independence.

Hoo'poe, name given to birds of the genus *Upupa*, on account of their note; most commonly applied to *U. epops*, a species found in

HOOPOE.

Europe, Asia, and Africa. The hoopoe is about 10 in. long, exclusive of the long, slender bill. The most conspicuous feature of the bird is its high, compressed crest.

Hoo'sac Riv'er, tributary of the Hudson; rises in Lanesboro, Berkshire Co., Mass.; flows N. and NW.; traverses the SW. angles of Vermont and Rensselaer and Washington counties, N. Y., affording abundant water power, which is extensively utilized; is called Hoosick in New York.

Hoosac Tun'nel, tunnel in the NW. part of Massachusetts; within the limits of the towns of Florida and Adams, Berkshire Co. The distance from Boston to the E. entrance is 137 m., and thence to Troy, 54 m. The first question of tunneling Hoosac Mountain was raised in 1825, with regard to the feasibility of a canal between Boston and the Hudson, but that project was abandoned when railways were introduced. Experimental work was begun in 1851, but no actual tunneling until 1856. In 1862 the state took possession, and the work was completed in 1873. The tunnel is a little more than 4¾ m. long, and is made large enough for two railway tracks. The greater part of the rock penetrated is a micaceous schist. A working shaft 1,028 ft. deep, which was sunk near the center of its length, is an important aid to ventilation. The cost of the tunnel and 39 m. of adjoining railroad was about $13,000,000.

Hop, *humulus lupulus*, a plant which with *Cannabis*, the hemp, composes the order *Cannabineæ*; is by some botanists regarded as a suborder of the nettle family. The hop is a vine, with a perennial root from which spring up numerous annual shoots, forming slender, flexible stems, angular and rough to the touch. These climb spirally on trees or around poles to the height of 20 or 30 ft. The hop is found

wild in America, Europe, and Asia. It has long been cultivated in Germany, where its use is traced back as far as the ninth century. In other countries it has become an important agricultural product, and in the U. S. is largely cultivated, and is an article of both export and import. The essential properties of the hop, its bitterness and fragrance, appear to reside in the lupuline; this was long supposed

Hop Plant.

to be the pollen of the hop, but it is found only on the pistillate catkins, and consists of peculiar glands attached to the base of the scales; their appearance when magnified is shown in the illustration. Besides their use for preserving and flavoring malt liquors, hops have a reputation as a tonic. Their efficacy depends both on the bitter principle and, to a less degree, the volatile oil. The narcotic and sedative effects of hops and lupuline are very slight, and to be obtained chiefly from large doses of the latter.

Hope, Sir James, 1808-81; British naval officer; b. Edinburgh; entered the British navy, 1822; became captain, 1838; served near Buenos Aires, 1844-45; in the Baltic, 1854-56; in the E. Indian and Chinese waters, 1859-63; transferred to duty in the W. Indies, 1863; became a G. C. B., 1865; full admiral, 1870; admiral of the fleet, 1879; principal naval aid-de-camp to the queen, 1873.

Hoph'ra, Hebrew name of Apries (Egyptian Uah-ab-Ra), an Egyptian king, 591-572 B.C., during the twenty-sixth dynasty. He made war on Tyre and Sidon, taking them and destroying the Cyprian fleet. In consequence, Nebuchadnezzar invaded Palestine and captured Jerusalem. Later, Apries took the part of the Libyans in a conflict with the Cyrenians, and was worsted. During a revolt which followed, Amasis II was declared king, and in the conflict for supremacy Apries was defeated and captured. He was taken to Sais and strangled.

Hopkins, Johns, 1795-1873; American philanthropist; b. Anne Arundel Co., Md.; acquired a fortune in business in Baltimore. The amount of his public gifts exceeded $7,000,000; the largest amounts being given for the establishment in Baltimore of the Johns Hopkins Hospital and the Johns Hopkins Univ.

Hopkins, Mark, 1802-87; American scholar; b. Stockbridge, Mass.; became Prof. of Moral Philosophy and Rhetoric in Williams College, 1830; was its president, 1836-72, after which he again became professor; published "Lectures on the Evidences of Christianity," "Miscellaneous Essays and Discourses," "Lectures on Moral Science," "Law of Love, Love as a Law," and "An Outline Study of Man."

Hop'kinson, Francis, 1737-91; American jurist; b. Philadelphia; member of Congress from New Jersey, 1776-77; signed the Declaration of Independence; was an admiralty judge in Pennsylvania, 1779-89; U. S. District Judge for Pennsylvania, 1790-91. His humorous, patriotic, poetical, and other pieces—"The Treaty," "The Battle of the Kegs," "Ode to Science," "Essay on Whitewashing," and many others—enjoyed an immense popularity.

Hoplitod'romos, in Grecian antiquity, a race run by men in armor or carrying the large round shield of the hoplite or heavy armed soldier. The statue in the Louvre known as the "Borghese Gladiator" is now thought to represent a runner in such a race.

Hor, mountain of Arabia Petræa, forming a part of the range of Seir or Edom, on which Aaron died. The summit, which is generally conceded to be the Mt. Hor of this incident, still bears the name of Mt. Aaron (Arab. *Jebel Harûn*), and, rising to the height of 4,580 ft. above the sea, is the most conspicuous summit of the range.

Hor'ace, or more fully, **Quintus Horatius Flaccus,** 65-8 B.C.; Latin poet and satirist; b. Venusia, Apulia; son of a freedman, a farmer and a collector of money paid at public auction; went abt. 45 B.C. to Athens to study philosophy and rhetoric, but the murder of Cæsar and the civil war which ensued made him a soldier, and he fought as a tribune under Brutus in the battle of Philippi, 42; after the defeat went to Rome, 41, having obtained pardon, and secured a clerkship in the quæstor's office, which he afterwards gave up in order to devote himself entirely to literary pursuits; made the acquaintance of Mæcenas, an Etruscan noble, who gave him a country seat near Tivoli, in the Sabine Mountains, and also a competency. His works comprise "Satires," "Epodes," "Odes," "Epistles," "Poetic Art," and "Secular Song."

Horatii (hō-rā'shĕ-ī) in Roman legend, three brothers chosen by King Tullus Hostilius as champions of Rome in the struggle with the city of Alba Longa, which was also represented by three brothers, the Curiatii. Two of the Horatii fell in the fight; the survivor, feigning flight, cut down each of his pursuers in succession. Horatius, having in the moment of triumph killed his sister, who was betrothed to one of the Curiatii and had an-

gered her brother by her lamentations, was condemned to be scourged to death, but on appealing to the people was pardoned, and afterwards sent to destroy Alba Longa.

Hora'tius, Publius, surnamed COCLES, in Roman legend, hero who, 507 B.C., when the Etruscans under Porsena besieged Rome, defended the Sublician bridge with two comrades till the citizens cut it down, then, throwing himself into the Tiber, reached the other shore in safety.

Ho'reb, according to some, a lower part or elevation of Mt. Sinai; others consider it to be a general name for the whole range of which Mt. Sinai was one of the principal summits. See SINAI.

Hore'hound, name of several labiate herbs of temperate climates. *Marrubium vulgare*, the common or white horehound, is naturalized in the E. U. S., but is a native of Europe and W. America. It is an excellent tonic remedy, very useful in coughs and colds, and is generally taken in sirup or candy. The fetid horehound (*Ballota nigra*) is also a naturalized plant from Europe. The water horehound (*Lycopus europæus*) grows in Europe and America, and is considered a good tonic.

COMMON HOREHOUND.

Hor'icon Lake. See GEORGE, LAKE.

Ho'rites, or **Ho'rims,** aboriginal inhabitants of Mt. Seir before the Canaanites conquered Palestine. Their name, which means "cave-dweller," is derived from Hori, the grandson of Seir, and refers to their habit of dwelling in caves, of which there still are many extant in the cliffs of Edom. They were exterminated by the Edomites.

Hori'zon, line formed by the apparent contact of the sky and earth. This is the *sensible* horizon. The plane of the horizon of any observer is one passing through the point where the observer stands, and perpendicular to the plumb line at that point. The *rational* horizon is a plane through the center of the earth parallel to the sensible horizon. This plane divides into two equal parts both the terrestrial and the celestial spheres.

Hormayr (hōr'mīr), **Joseph, Freiherr von,** 1782–1848; German historian; b. Innsbruck, Austria; became, 1803, court secretary, with charge of the secret archives; was court commissioner in Tyrol during the revolution of 1809 against the Bavarians, and was active in aiding the movement; took part in a second revolution and was imprisoned, 1813; on his release, entered the service of Bavaria; was ministerial councilor in the department of foreign affairs; was subsequently minister resident at Hamburg and at Bremen. Works include "History of Tyrol," "The Austrian Plutarch, or Lives of all the Austrian Princes," "General History of Modern Times."

Horn, Gustaf Carlsson, 1592–1657; Swedish military officer; b. Orbyhus; received his military training in Holland under Prince Maurice of Orange, and entered the Swedish army, 1624. Gustavus Adolphus called him his right arm, and after the battle of Lützen he made a brilliant campaign in the Rhenish Palatinate, but was taken prisoner in the battle of Nördlingen, 1634. Having been exchanged, 1642, he returned to Sweden; commanded, 1644, in Scania against the Danes; was made a count and field marshal, 1651.

Horn, modification of the epidermis, presenting the same structure, whether in the nails of man, the claws of the carnivora and birds, the hoofs and horns of ruminants, the spines of the porcupine and hedgehog, the plates of the armadillo, the whalebone of cetaceans, the quills of birds, or the shell of tortoises. The horns of the stag and other antlers which are shed periodically are true bone, and belong to the dermal or exoskeleton. Horn is composed of hardened albumen, gelatin, and a small portion of phosphate of lime. In the ox, sheep, and other hollow-horned ruminants there is a central core of bone on which the horns are molded. Horn in its many varieties is adapted to numerous useful purposes. The Egyptians and Hebrews made musical instruments of horns. The form of the horn adapted it for a drinking utensil, and the word is still sometimes employed in a manner to suggest this application. Horn was anciently employed for bows, and sometimes for scale armor. It also served instead of glass for windows.

Horn (so called in English, as in many other languages, because originally made from the horn of an animal), wind instrument of music, usually of brass, much used in the orchestra. The French horn is coiled in such a way as to become portable, and its key may be modified by the insertion or withdrawal of suitable pieces. The valved horn is a modification of the older instrument. Various other wind instruments are called from their shape "horns," and in ancient times the horns of animals were employed as trumpets, but they probably served only as the means of calling. The horn is seldom played singly in the orchestra. A pair, at least, and in modern scoring two pairs, are usually employed.

Horn'beam, name given to various trees. The hornbeam of Europe is the *Carpinus betulus*, a handsome forest tree which has very tough, white wood, prized by turners and joiners. In the U. S. the *C. caroliniana* is called hornbeam, lever wood, iron wood, and blue beech. It is very hard, tough, and close grained. The hop hornbeam, called also lever wood or iron wood, is a slender tree, the *Ostrya virginica*, with wood of the same qual-

ities as those possessed by that of the former tree. Both grow extensively throughout the

Hop Hornbeam.

U. S. All the above belong to the family *Cupuliferæ*.

Horn'bill, common name for a number of birds of the family *Bucerotidæ*, remarkable for the great size and peculiar development of their bills. The species vary in size from 1½ to 4 ft. in length. The hornbills fly heavily

Rhinoceros Hornbill.

and with an astonishing clatter of wings, and utter loud, discordant cries, the voice of the great hornbill (*Dichoceros bicornis*) having been compared by Wallace to something between the shriek of a locomotive and the bray of a jackass.

Horn'blende, term used in mineralogy, sometimes as synonymous with amphibole, sometimes to designate only the dark-colored varieties of that variable mineral. In the former sense hornblende is a mineral crystallizing in the monoclinic system, but occurring also imperfectly crystallized, or massive, fibrous, and granular. It presents a great variety of forms and great differences in color; black and dark-green varieties are especially known as *hornblende*; lighter green as *actinolite*; white varieties as *tremolite*; and fibrous forms as *anthophyllite*, *asbestos*, and *amianthus*.

Horn'book, written or printed tablet of parchment or paper, covered with a thin transparent layer of horn, and framed in wood, containing the alphabet in Roman or black letter, with some other simple lessons, often followed by the Lord's Prayer. Hornbooks appear to have been chiefly English. Their use originated before the invention of printing, and continued till about the middle of the eighteenth century. There are few existing specimens.

Horn Bug. See Stag Beetle.

Horne, Richard Hengist, 1803–84; English author; b. London; became a midshipman in the Mexican navy; was in Australia, 1852–69, where he held local magistracies; returned to England, 1869; wrote several tragedies, "The Death of Marlow," "Gregory VII," "Cosmo d' Medici," etc., and a number of poems and miscellaneous works, among which are "Orion, an Epic," and "Australian Facts and Figures."

Horne, Thomas Hartwell, 1780–1862; English biblical critic; b. London; took orders in the Church of England, 1819; was senior assistant librarian in the British Museum, 1824–60; became a prebendary of St. Paul's, 1841; principal work the "Introduction to the Critical Study of the Scriptures."

Horned Toads, popular name of lizards belonging to the genus *Phrynosoma*, of which several species are found in Texas, Mexico, California, Utah, etc. They live in the fields

Horned Toad.

among cactus and weeds, lying close to the ground, and are sluggish in their movements. They feed on ants and other insects, and have the singular power, when irritated, of ejecting blood from the eye with considerable force.

Hor'net, name applied to several large stinging insects of the wasp family. The most common in the U. S. is the *Vespa maculata*, which builds a great nest of brown or grayish paper, hanging from the branches of a tree.

Its paper is made from the fiber of wood. Its sting is severe. The hornet is omnivorous,

HORNETS AND NEST.

devouring fruits, honey, and insects of many kinds.

Horn'pipe, English dance, probably so called from an obsolete instrument of which only the name is known. This lively dance, of jiglike character, appears to date back to 1700 at least. The earlier ones are in triple measure, the later in double or quadruple.

Horologium (hŏr-ō-lō'gĭ-ŭm), S. constellation, inserted by La Caille E. of Eridanus; number of stars, twelve, the brightest of the fourth magnitude; on the meridian at 9 P.M., in December.

Horol'ogy, science of the divisions and measurements of time by means of clocks, watches, sundials, and other devices. See CHRONOLOGY; CLOCK; DIAL; WATCH.

Hor'oscope, in astrology, a diagram of the position of the heavenly bodies, especially of the planets and the signs of the zodiac, at the time of a person's birth, from which was derived an augury of his career and fortunes. The most important thing was the sign of the zodiac which rose at the moment of the child's birth. As a rule, one born under Jupiter would be powerful; one under Mars, warlike; one under Venus, successful in love; one under the Pleiades, exposed to storms at sea, etc. Horoscopes were also calculated on the same general principles to foretell the issue of any important undertaking.

Hor'rocks, or **Hor'rox, Jeremiah,** abt. 1619–41; English astronomer; b. Toxteth, Lancashire; became curate of Hoole, Lancashire, where, 1639, he made an observation of the transit of Venus (November 24th). William Crabtree was apprised by Horrocks of the calculations which led him to expect this transit (which not even Kepler had predicted), and accordingly Crabtree and Horrocks both made observations (the first on record) of the transit.

Horse, simple-hoofed, nonruminating quadruped, constituting the soliped family of Cuvier's order of *Pachydermata*, and, in Owen's system, the family *Solidungula*. Zoölogically considered, the family consists of the single genus *Equus*, distinguished from all other quadrupeds by having only one apparent toe and a single solid hoof on each foot, although under the skin are the rudiments of two others on each limb.

The original native country of the horse (*E. caballus*) is not certainly known; but he

MUSTANG.

was most probably first brought under the subjection of man in central Asia or in the part of N. Africa adjacent to Nubia and Abyssinia. Horses exist in the wild state in N. Asia and in America, the descendants of individuals formerly domesticated; in such cases they live in large troops, conducted in their wanderings and battles by an old male who has conquered the position of chief by superior strength and courage, and who, when his powers fail, is superseded by another. When danger threatens, they close their ranks, and pre-

ARABIAN HORSE.

sent an unbroken circle of heels to the enemy, which is generally some of the larger carnivora. Wild horses, as now met with, are generally smaller but more muscular than the domesticated ones, with less variety of color, stronger limbs, larger head, longer and less erect ears, more bushy mane, less sleek coats, and smaller and more pointed hoofs. The wild horse, or mustang, even when adult, is readily domesticated; the American Indians are dex-

terous in taking them on the prairies and the pampas by means of lassoes, and much of the wealth of many tribes consists in their herds of these animals roaming without any apparent control.

Most countries have peculiar breeds of horses, adapted to the climate and wants of the region. In Arabia we find a horse remarkable for fleetness, endurance, and docility; its blood by intermixture has been made to improve other races of all sizes and constitutions, producing the breeds most highly valued both in Europe and the U. S. The

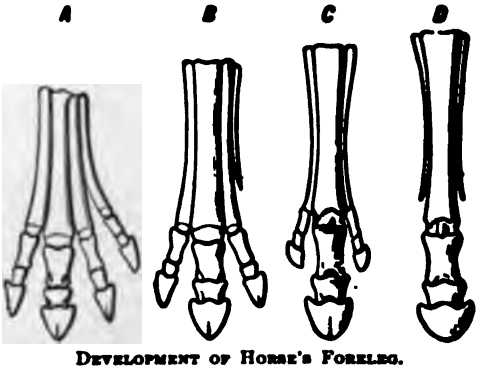
SHETLAND PONY.

Americans and English have paid the most attention to the breeding of horses, and have surpassed all other nations in the quality of speed. The foundation upon which the English thoroughbred, the oldest and best established of all the breeds of horses, was built was a promiscuous mingling of the horses of Great Britain—first with the larger races of Europe, especially those of Normandy, Flanders, and Germany, and with the lighter, more agile and graceful horses of Spain, the latter being almost identical with the Barbs on the other side of the Mediterranean.

A mature male of the horse kind is called a stallion, the female a mare, and the young of either sex a foal. The male foals are called colts and the females fillies. Many of the foals are castrated at the age of two years, and are then known as geldings. Most of the workhorses used in the U. S. and Great Britain are either geldings or mares. The stallions, except in France and a few other European countries, are not used for ordinary business purposes.

The food of the domesticated horse consists chiefly of grains, oats being more largely used than any of the others, although the Indian corn (maize) is much used in the U. S. On account of its high percentage of fat-producing elements, however, maize is not generally recommended, except in cold climates, or when the animal is in a low state of flesh. Its use tends to increase the temperature, and promotes the formation of fat rather than of muscle. A general diet, which finds great favor with most horse feeders, is composed of a mixture of maize and oats, about two parts in weight of the latter to one of the former in warm weather, with the proportions reversed for use in winter. Barley, wheat, peas, beans, and rice are also used as food for the horse in various countries. Its natural food, however, is grass, and without this in some form the horse cannot long be kept in a healthy condition. This demand of nature is met largely by the use of hay or fodder, prepared from some of the many grasses, cut when matured and properly dried and preserved. The foal is sustained mainly by the milk of the dam until it is about six months old, when it is separated from the dam and taught to subsist on other foods.

At about two years of age foals are usually "broken"—that is, the process of training is begun. They do not usually mature fully until from four to six years of age, but in this particular the various breeds differ greatly, the smaller breeds maturing earlier. All the types may begin to reproduce at about two years of age. The pony is at his best when from four to six years old; the thoroughbred, the trotter, and the coach and roadster breeds at from five to eight, and the large breeds at from six to twelve years of age. Thoroughbreds are most highly prized for racing purposes at two and three years old, but the greatest turf performances have been made by matured horses. Trotters seem to have a longer period of matured powers, some of them having held a conspicuous place in contests of speed for twelve or thirteen consecutive years. The great trotting mare Goldsmith Maid began her racing career when she was eight years old. Her best record (a mile in 2:14) was made when she was seventeen



DEVELOPMENT OF HORSE'S FORELEG.

A. Orohippus (Eocene). *B*. Mesohippus (Miocene). *C*. Protohippus (Pliocene). *D*. Equus (Quaternary and Recent).

years old, and this mark was again reached by her when in her nineteenth year. See HORSE RACING.

The large number of equine mammals and their regular distribution in geological time afford a good opportunity to ascertain the probable lineal descent of the modern horse. The American representative of the latter is *Equus fraternus*, a species almost, if not entirely, identical with *E. caballus*, to which the recent horse belongs. Huxley has traced the later genealogy of the horse through European extinct forms, but the line in the U. S. was a

more direct one, and the record is more complete. Taking, as extremes of the series, *Eohippus pernix*, from the Eocene, and *Equus fraternus*, from the Quaternary, the natural line of descent, as indicated by over thirty intermediate forms, would seem to be through the following genera: *Eohippus*, *Orohippus*, and *Epihippus* of the Eocene, *Miohippus* and *Mesohippus* of the Miocene, *Protohippus* and *Pliohippus* of the Pliocene, and *Equus*, Quaternary and Recent. The most marked changes undergone by these successive genera are the following: (1) increase in size, from *Eohippus*, as large as a rabbit, to the modern horse; (2) increase in speed through concentration of the limb bones; (3) elongation of the head and neck and modification of the skull. The increase of speed was a direct result of a gradual and striking modification of the limbs. There was (1) a change in the scapula and humerus, especially in the latter, which facilitated motion in one plane only; (2) an expansion of the radius and reduction of the ulna, until the former alone remained entire and effective; (3) a shortening of all the carpal or wrist bones and enlargement of the median ones, insuring a firm wrist; (4) an increase in size of the third digit at the expense of those on each side, until the former alone supported the limb. The latter change is clearly seen in the accompanying diagram, which represents the fore feet of four typical genera in the equine series, taken in succession from each of the geological periods in which this group of mammals is known to have lived.

Horse-chest'nut (*i.e.*, large or coarse chestnut, the word *horse* being sometimes used thus

LEAVES AND FLOWER OF HORSE-CHESTNUT.

to signify large, coarse), ornamental tree, esteemed on account of its rich foliage and beautiful flowers, cultivated everywhere in Europe and where the climate is suitable. It is one of the species of *Æsculus* (*Æ. hippocastanum*), a genus containing also the buckeyes of the U. S., and belonging to the family *Sapindaceæ*.

FRUIT OF HORSE-CHESTNUT.

Horse Guards, mounted guards, who were formerly the most magnificent and costly of all the royal following. The Royal Horse Guards of the British army were instituted 1550, under Edward VI, and revived by Charles II, 1661. The duty of the Royal Horse Guards consists in guarding and escorting the person of the sovereign. The term Horse Guards is also used to denote the headquarters of the staff of the British army in Whitehall, London, which is guarded by a squadron of Horse Guards.

Horse Lat'itudes, region of the calms in the Tropic of Cancer, in the Atlantic; so called by mariners because it is said that in colonial times the numerous vessels freighted with horses from New England for the W. Indies were often long detained in these dreaded calms, under the burning rays of the sun of these latitudes, causing a great mortality among their living freight.

Horse'manship, art of mounting, riding, and managing horses. Horseback riding requires and develops courage, self-possession, and well-trained nerves and muscles. Riding can be learned only by practice, but some principles may be stated for the assistance of learners.

The saddle, held firmly by girths, is designed for comfort and security; it consists of the tree or frame, over which leather is stretched; the flaps with knee puffs, which are padded elevations on the front of the flaps—to increase security of seat—and stirrups; the pads have billets and girths. Various forms of the English saddle are adopted in racing, hunting, and cross-country riding. The woman's saddle has a pommel and a leaping horn, to give security and firmness in the sidewise position. The bit serves to guide and control the horse. The simplest bit is the snaffle—two pieces of steel linked in the center, with rings on the ends. It acts on the corners of the horse's mouth directly from the rider's hand. The curb bit has a stiff mouthpiece in the center, and on each side a lever; to the lower ends of these the reins are attached; the curb chain, joining the upper edge of the levers, serves as a fulcrum, and a pull of the curb reins brings the lever power to bear on the lower jaw just above the bridle teeth. The curb is more severe than the snaffle, and has a downward and backward effect, while the snaffle raises the head and neck. The "Pelham," a combination of the two, is used chiefly in hunting. For ordinary riding the full bridle is generally used; it consists of the headstall, with fore-

head band, throatlatch, two bits (curb and snaffle), and reins.

One should have the feeling of being in the middle of the horse, and of embracing the saddle with the limbs from the knee up. The legs, from the knee down, are not to be used to keep one's seat, but only to act on the horse's flank. The foot, with the ball in the stirrup, should be carried parallel to the horse, and the heel depressed. Beginners should carry the snaffle reins in both hands in order to learn the uses of both right and left; later curb and snaffle should be handled alike, and finally one hand may be used. The spur, attached to the boot heel, serves both as an aid and as a goad. The horse is guided by a pull on either rein or pressure against the neck, or both, and also controlled by pressures of the leg on the flank, the horse moving forward if both legs are used simultaneously, or sidewise if pressure is exerted on one side only. In a walk and a gallop, horse and rider should be as one, while in a trot, and particularly for outdoor and distance riding, the English trot is generally adopted. In this the rider's body is raised slightly above the saddle, with the knees as pivots, and lowered again in rhythm with the motion of the horse.

Horse Meat. See HIPPOPHAGY.

Horse Pow'er. See DYNAMIC UNITS.

Horse Rac'ing, the practice of racing with horses. Horse racing in some form was a popular amusement among the most ancient people of whom any account has been handed down. Chariot racing was introduced in the Olympic games in 680 B.C. The Romans took up the sport, and a large stable was a mark of distinction among the wealthy patricians. The Romans, like the Greeks, had their mounted races, but the riders did not use saddles, which were not invented until the fourth century.

The first mention of horse racing in England is by Malmesbury, who tells of horses sent by Hugh Capet in the ninth century to King Athelstane. In the twelfth century a regular race course was established in London —the celebrated Smithfield. During the reign of George II the Godolphin Arabian appeared, the founder of the best English "blooded" horses. There are numerous provincial race meetings in England, Scotland, and Wales, some held twice in the year. The annual Derby (Epsom) is the great London holiday, where 350,000 people often assemble.

Steeplechasing, so called either from the *steep-hill* riding which it involves or from a steeple in the distance having been originally the goal, consists of headlong riding over a ground abounding in all kinds of impediments. It is of Irish origin. Hurdle racing was invented by George IV, on Brighton Downs. Hurdles are sections of light fences, partly covered with green boughs to give them the appearance of natural jumps.

In Great Britain the courses are usually straight, and consist of thickly sodded turf, elastic to the tread. In the U. S. the regular course is a mile, made of two semicircles, each a quarter of a mile long, joined by two straight quarters, the one at the outcome being termed the "home stretch." The first important kite-shaped track was built at Independence, Ia., 1890. The one long turn proved faster than the two short turns of an oval or regulation track, and breeders and critics promptly drew a distinguishing line between what were designated as regulation and kite records. A kite record was not valued as highly as a record on an oval or regulation track.

The first regular racing in the U. S. of which we have any authentic record was in 1665. Gov. Nicolls, first English governor of the colony of New Netherlands, established a race course at Hempstead Plains, Long Island, and horse racing became one of the principal amusements of the American colonies. In France the sport is on a firm footing, receiving encouragement and financial aid from the government. Racing is also carried on in Canada, Austria, and Hungary, and to some extent in Mexico and British Guiana. Very successful horses win from $10,000 to over $100,000 a year in the U. S., and even more in England. The richest stakes in the U. S. are for two-year-olds.

In racing there is a classification as to age, the youngest horses carrying the least weight where horses of different ages are engaged. In May the horses carry less than in subsequent months, and in short-distance races they are required to carry more than in long ones. Trotting is essentially a N. American sport. Time is the basis of the handicap, and the classes range from 2:10 to 2:30. When a horse acquires a record of 2:29, he is compelled to start in a faster class.

While, ostensibly, the justification of horse racing lies in the improvement of the breed of the horse, the incentive to interest in the races lies in the betting. In England race-track gambling is regarded by many reformers as little short of a national curse. In the U. S., legislative action tends to abolish horse racing altogether.

Horse'-radish, popular name of *Nasturtium armoracia*, a perennial herb of the order *Cruciferæ*, whose large white roots furnish a well-known pungent condiment for the table. The

HORSE-RADISH.

roots yield a volatile oil which contains sulphur. The plant is a native of Europe, and is half naturalized in the U. S. Horse-radish leaves and roots are used in medicine as local stimulants. They have also antiscorbutic properties.

Horse'shoe Crab, or **King Crab,** popular name of the species of *Limulus*, a problematical genus found upon the E. coasts of both hemispheres. The body consists of three regions, anterior portion (carapax), resembling in a striking manner the foot of a horse, a middle piece (abdomen), and a terminal spine (telson). On the upper surface of the carapax are four eyes, two compound ones on the sides and two simple ones side by side in front. Beneath, the carapax supports six pairs of walking feet, while beneath the abdomen are six broad, leaf-like appendages, the posterior five being the gills, arranged like the leaves of a book. The mouth occurs between the bases of the legs, the vent is beneath the base of the telson. During most of the year the horseshoe crab lies in deeper water, burrowing in the mud of the bottom, where the sharp edge of the carapax enables it to go with ease. During the months of May and June it comes to the shores in great numbers, and there lays its eggs in the sand, near high-water mark. It feeds on mollusks and worms. Fossil forms strikingly like the horseshoe crab of to-day occur in the Carboniferous rocks, showing that the form has suffered slight change for an enormous length of time.

Horse'tail, Joint Rush, or **Scour'ing Rush,** common names of species of the genus *Equisetum*, in the family *Equisetaceæ* of the Fern-worts. Of the twenty species now existing,

COMMON HORSETAIL SCALES AND SPORES AND BARREN AND FERTILE STEMS.

thirteen are found in N. America. They have little economic value. Cattle eat the stems of some of the species, and in Holland *E. hiemale* is used in polishing cutlery.

Hors'ley, John Callcott, 1816–1904; English painter; b. London; became a Royal Academician, 1865; best-known works: "The Spirit of Religion" and "Satan Touched by Ithuriel's Spear," frescoes in the houses of Parliament; "The Pride of the Valley," in the National Gallery; "L'Allegro and Il Penseroso," "A Scene from Don Quixote," and "Caught Napping."

Horsley, Samuel, 1733–1806; English prelate; b. London; from 1773 was for several years secretary of the Royal Society, and wrote mathematical and critical works; 1788, was made Bishop of St. David's; 1793, of Rochester; and, 1802, of St. Asaph. His controversy with Dr. Priestley concerning the divinity of Christ, which lasted for several years, attracted much attention.

Hortense (ōr-tōńss'), full name, HORTENSE EUGÉNIE DE BEAUHARNAIS, 1783–1837; Queen of Holland; b. Paris; daughter of the French general Alexandre de Beauharnais and of Joséphine Tascher de la Pagerie, who became the wife of Napoleon I. In 1802 she married Louis Bonaparte, afterwards King of Holland, and brother of Napoleon I. She bore him three sons, of whom the youngest, afterwards Napoleon III, alone survived her. After the fall of the First Empire, Queen Hortense resided usually in her chateau of Arenenberg, Switzerland.

Hortensius (hōr-tĕn'shĭ-ŭs), **Quintus,** 114–50 B.C.; Roman orator, the most famous next to Cicero; at the age of nineteen made his first public speech, soon after which he came into prominence by his successful defense of a petty king of Bithynia; passed through the various stages of public life leading up to the consulship, and held this office 69 B.C. In political sympathies he was of the party of the aristocracy. His oratory was of a florid, brilliant character, of the Asiatic type, best suited to produce striking effects in oral presentation. In addition to orations, Hortensius wrote some rhetorical treatises and poems.

Hor'ticulture, art and science of the cultivation of garden plants. A garden is understood to be that part of an estate or homestead which is devoted to fruits, vegetables, and ornamental plants, in distinction to those areas used for cereals or general field crops, forage plants, forestry, and the care of domestic animals. The term *garden*, as also *hortus*, originally related to an inclosure which commonly surrounded the house or lay close to it. Gardening and horticulture are synonymous terms. Horticulture, as understood in the U. S., includes three great divisions: pomology, olericulture, floriculture, and a fourth may be added under the name of landscape horticulture. Pomology is the art and science of growing fruits; olericulture concerns itself with those plants commonly denominated "vegetables"; floriculture deals with ornamental plants for their own or individual uses; while landscape horticulture considers ornamental plants with reference to their uses in the landscape, and is therefore closely related to landscape gardening. See AGRICULTURE; GRAFTING.

NORTH AMERICAN WILD FLOWERS.

1. Wake-robin
2. Golden-rod
3. Gray Golden-rod
4. Purple Violet
5. Sweet White Violet
6. Hepatica
7. Pink Lady's Slipper
8. New England Aster
9. Bird-foot Violet
10. Dog Rose
11. Downy Yellow Violet
12. Wild Geraniums
13. Wild Orange-red Lily
14. Adder's Tongue
15. Marsh Marigold
16. White Water-Lily
17. Blue Flag
18. Arrowhead

Hor'ton, Samuel Dana, 1844–95; American publicist; b. Pomeroy, Ohio; began the practice of law at Cincinnati, 1871; was one of the earliest advocates of the establishment and maintenance of an international ratio between gold and silver; secretary of the International Monetary Conference at Paris, 1878, and a delegate to the conference of 1881; chief works, "Silver and Gold and their Relation to the Problem of Resumption, "The Silver Pound and England's Monetary Policy Since the Restoration, together with the History of the Guinea, Illustrated by Contemporary Documents," and "Silver in Europe."

Ho'rus, name of several Egyptian gods, of which the principal was the son of Osiris and Isis. He was the sun god, and is often confounded with Harpocrates, who was called the Younger Horus; also with Haroeris, the hawk-headed god, called the Elder Horus. He is also confounded with the god Ra and with the Greek Apollo, whence Edfou was called Apollinopolis Magna, since it was a great seat of the worship of Horus.

Horvath (hōr'vät), **Mihaly,** 1809–78; Hungarian ecclesiastic and historian; b. Szentes; was, 1844, appointed Prof. of the Hungarian Language and Literature in Vienna; during the Hungarian revolution, 1848, was made Bishop of Csanád and Minister of Public Education and Worship; after the revolution lived alternately in France, Italy, and Switzerland until 1866, when he was permitted to return to Hungary; most important work, "History of Hungary."

Hosack (hōs'ăk), **David,** 1769–1835; American scientist; b. New York; Prof. of Botany in Columbia College, 1795–97; of Materia Medica, 1797–1807; of Materia Medica and Midwifery in College of Physicians and Surgeons, 1807–11; was one of the first mineralogists and botanists of his time; founded the first botanic garden in the U. S., and was the author of several medical treatises which long had a standard value.

Hosan'na, Hebrew term of blessing, congratulation, or well-wishing, adopted into use by the Christian Church. The name is also given to one of the subdivisions of musical masses, "Holy, holy, holy, Lord God of Sabaoth; heaven and earth are full of thy glory. *Hosanna* in the highest."

Hose'a, first of the "minor prophets" and author of the book of the Bible which bears his name; was the son of Beeri; commenced his prophecy abt. 785 B.C., and exercised his office at intervals for about sixty years. His prophecies are in one continued series, without any distinction as to the times when they were delivered or their subjects.

Hoshe'a, last King of Israel; son of Elah. The Bible says that he slew his predecessor, Pekah; the Assyrian records add that he was placed in power by Tiglath Pileser, King of Assyria. The Bible dates his accession nine years before the downfall of Samaria—that is, 727 B.C.—but dates the death of Pekah nine years earlier. Possibly he was for nine years Assyrian governor, and assumed the style of king only at the death of Tiglath Pileser. His reign was disturbed by civil commotions and by Assyrian invasions, and he probably perished at the destruction of Samaria.

Hosius (hō'shĭ-ŭs), abt. 251–359; Spanish prelate; b. perhaps in Spain or in Egypt; became Bishop of Cordova abt. 296; was sent by Constantine the Great to Alexandria to conciliate the contending parties of Alexander the bishop and of Arius; was present at the Council of Nice, 325 A.D.; induced Constantine to ratify the Nicene Creed, 325; was directed by Constantius, 355, to write against Athanasius, but refused; was compelled by the emperor to attend the Council of Sirmium, and after wearisome persecution to take the communion with Arians, but he would not condemn Athanasius. In 357 he was permitted to return to Cordova, where he died.

Hospice (hōs'pēs), specifically, any one of the houses maintained by ecclesiastics for the relief of travelers passing over the Alps in stormy weather. That of the Great St. Bernard, founded 962 and inhabited by Augustinian monks, is the most celebrated. Others are kept up at the principal passes of the Alps.

Hos'pital, an institution intended primarily for the care of the sick and wounded; secondarily, to furnish means of instruction to students of medicine and of nursing, to serve as a monument or memorial of its founders, or as a means of support for its owners. Hospitals for the sick poor appear to have been established in India, through the influence of Buddhist priests, abt. 220 B.C. They are, however, more especially characteristic of Christianity, and were recognized institutions in the fourth century. Hospitals may be designed to receive patients of both sexes and all ages, or may be more or less specialized—as for women, for the insane, for contagious diseases, etc. In some respects the simplest form of hospital is that intended for adult males only—as in the military and naval service. It was at one time thought that in these the buildings should be temporary in character—that is, not intended to last more than ten or twelve years—the idea being that they would be less liable to become infected than much more ornamental, pretentious, and costly structures, and that if infected they could be destroyed with comparatively small loss. Discoveries as to the bacterial origin of suppuration, erysipelas, and septicemia, with their practical applications in the details of antiseptic and aseptic surgery and obstetrics, have largely done away with the dangers of infection in hospitals, and the idea of building temporary hospitals is now considered solely from the financial point of view.

The true principles of hospital construction, as first established by a commission of the French Academy of Sciences, 1778, and subsequently elaborated as to details by Nightingale, Galton, Oppert, and others, may be briefly stated as follows: The important part of the hospital is the ward, which should be separated from the administrative part of the in-

stitution, and should be arranged in pavilions, preferably of one story in height. These pavilion wards should be from 25 to 28 ft. wide, 14 ft. high, and of sufficient length to allow not less than 100 sq. ft. per bed. In warm climates the height should be 15 ft. and the floor space per bed 120 sq. ft. Not more than 32 beds should be placed in each ward. The windows should be opposite each other, and reach within 3 ft. of the floor to 1 ft. from the ceiling; they should occupy one third of the wall space, have a nearly E. and W. exposure, and in cold climates should be double-sashed or of plate glass. The floors and other woodwork should be of hard pine or oak, with impervious joints, waxed, oiled, or permeated with paraffin, and polished. In permanent hospitals it is usually best to have the walls constructed with a soapstone, adamant, or other hard finish, with the expectation that they will be painted in oil after five or six years.

The great object is to have the ward supplied with plenty of light and fresh air, and to keep it at a proper temperature. The minimum amount of fresh air to be furnished is 3,000 cubic ft. of air per hour per man, and under some circumstances it may be desirable to double this amount. The ventilation of each ward, water-closet, bathroom, and kitchen should be entirely independent of all other rooms, halls, or parts of the building. The wards may be rectangular or octagonal or circular. The kitchen and laundry should be either in a separate building, or in the upper story of the administrative building; they should never be put beneath the wards or offices.

Besides the care of the sick, it is necessary in many hospitals to provide for the supervision and restraint of the vicious. The proper restraint of patients without giving the building a gloomy and prisonlike aspect is best secured by placing the hospital in such a location that access to means of dissipation shall be as difficult as possible. On this account a small island is a very desirable locality, and especially so in seaport towns and for marine hospitals. Floating temporary hospitals also have many advantages at such points.

Hos'pitallers, name given to the members of various fraternities and sisterhoods of the Roman Catholic Church, who join to the vows of perpetual poverty, chastity, and obedience; another which binds them to serve the poor and sick in hospitals. Some knightly orders took the monastic and hospital vows also—such as the Knights of St. John of Jerusalem, Knights of the Holy Sepulcher, and the Teutonic Knights; but in the case of the first-mentioned order, at least, the *hospitals* they founded were rather in the nature of *hostels* or public inns.

Host, in the Roman Catholic Church, the consecrated Eucharistic bread, believed by that church to be the veritable body of the Lord Jesus Christ. As such, it is elevated by the priest at the mass for the adoration of the people. It is a circular wafer or cake of unleavened bread, having various emblematic figures, and is made of the finest wheaten flour. It is borne on a plate called the paten, broken by the priest over the chalice, and received by him at the communion. The host consumed by the priest, or used in the public adoration of the blessed sacrament, is much larger than those distributed to the communicants. See ELEVATION; MASS.

Hos'tages, persons placed under the control of the government of a state as pledges of the faithful fulfillment of a treaty. The same custom has taken place when a captured vessel is allowed to go on its way upon what is called a ransom contract, and also in other stipulations between parties at war. But in no case was the life of a hostage at stake in case of violation. The practice has gone out of use in the first-mentioned case, the last instance probably having been the detention of two British noblemen on parole at Paris after the peace of Aix-la-Chapelle in 1748, who were, in fact, to remain in this condition until Cape Breton should be restored to France.

Hot-air En'gine, prime mover in which the motive power is derived from the expansion of air by heat. Numerous inventions of this kind have been produced, of which the earliest to excite interest was that of Dr. Stirling, patented, 1816, though earlier air engines had been constructed by Sir George Cayley and others.

Air engines may be arranged in two classes, (1) those which draw their supplies directly from the atmosphere, and discharge them into the atmosphere again after they have produced their effect; and (2), those which employ continually the same air, which is alternately heated and cooled but is not allowed to escape. Stirling's first engine belonged to the first of these classes; his later forms to the second. The second class have the advantage that they admit the use of high pressures; but this is attended with the disadvantage that they require refrigerating appliances, which with the first are unnecessary. In each of these classes a subordinate classification may be made, according as the air is heated in the cylinder in which it performs its work, or in a separate chamber. In this class of engines the arrangements admit of a variety of modifications. The heater and the refrigerator, for example, may be both independent of the working cylinder, and of each other; presenting an analogy to the boiler and condenser of the steam engine; or the refrigerator only may be separate; or finally the heating and refrigeration may take place at the opposite extremities of the same vessel, the air being driven from one end to the other alternately by means of a plunger.

Ericsson's engine is more generally known in the U. S. than any other. In the original model a working cylinder was placed over the fire of the furnace, and a cylinder of supply of about two thirds the capacity was placed over that. The engine was single acting, the working cylinders were quite open, and the working pistons were of great bulk and formed of non-conducting substances, being designed to fill the cylinders when at the point of the lowest depression, so as to prevent their cooling by contact with the air of the atmosphere. The

bottom of each cylinder was arched, forming a dome for a furnace, and the piston received at its lower surface a corresponding figure. The pistons of the supply cylinder and working cylinder were firmly connected, and had therefore an equal length of stroke. At the descent of the piston, the supply cylinder was filled by aspiration from the atmosphere; and in the ascent, the charge, after undergoing compression, was driven into a reservoir, from which it passed into the working cylinder. The upward stroke being completed, the heated air escaped through a regenerator formed of wire gauze, depositing there its excess of heat; and the new charge from the reservoir, passing to the working cylinder through the same regenerator, reabsorbed this heat, and thus entered the heating chamber already at an elevated temperature. This engine performed very well in practice, so far as its performance was merely a question of mechanics; but it failed practically, because the heating arrangements were inadequate to the demand made upon them.

Hot'bed. See GREENHOUSE.

Hotch'kiss, Benjamin Berkeley, 1826–85; American inventor; b. Watertown, Conn.; followed the machinist's trade for many years; then turned his attention to gunnery; and invented the machine or rapid-fire gun bearing his name.

Hotho (hō'tō), **Heinrich Gustav,** 1802–73; German historian of art; b. Berlin; was a pupil of Hegel, and became Prof. of History at Berlin, 1829; assistant curator of the Gallery of Paintings, 1830; and director of the engravings in the Royal Museum, 1859; works include "History of Painting in Germany and the Low Countries."

Hot Springs, capital of Garland Co., Ark.; on Hot Spring Creek; 55 m. SW. of Little Rock; derives its name from thermal springs, seventy-two in number, which are much frequented by invalids, particularly those having rheumatic or cutaneous affections. In the vicinity are valuable mines of gold, silver, and lead. The city contains a U. S. Army and Navy General Hospital, and the Academy and Convent of our Lady of the Springs. Pop. (1908) 9,773.

Hot'tentots, people of S. Africa, including the original inhabitants of the territory now occupied by Cape Colony. Their general characteristics are a peculiarly livid and yellowish brown skin, crisp and tufted hair, a narrow forehead, projecting cheek bones, a pointed chin, a body of medium height, small hands and feet, and a flat and narrow skull. They are skilled in horsemanship, are intelligent and courageous, and many have been civilized and educated. They are of a mild disposition, but given to lying, stealing, drunkenness, and sensuality. The Hottentot language is chiefly monosyllabic, and has several dialects. It is rich in diphthongs and remarkably delicate in the use of inflexional final sounds, which contrast strangely with the constantly recurring initial clicking sounds.

Hottentot's Bread, kind of yam growing in S. Africa; is a beautiful vine, springing from the back of a large, rough, tortoiselike tuberous rhizoma, which grows half uncovered. The rhizoma affords starchy food.

Hot'tinger, Johann Heinrich, 1620–67; Swiss scholar; b. Zurich; Prof. of Church History and Oriental Languages at Zurich, 1642–55, 1661–66, and at Heidelberg, 1655–61. His numerous essays on the text of the Old Testament procured for him great renown.

Houdin (ō-dăn'), **Robert,** 1805–71; French conjurer; b. Blois; studied mechanics, and won a medal for his toys and automata at the Paris Exhibition of 1844; in 1845 opened in the Palais Royal a series of *soirées fantastiques*, which he continued for ten years; in 1856 went to Algeria on the invitation of the French Govt., and entered into a competition in making miracles with the marabouts or priests, and contributed much to the breaking down of the bad influence of these impostors; after his return he published his "Life" and his "Confidences."

Houdon (ō-dōn), **Jean Antoine,** 1741–1828; French sculptor; b. Versailles; executed numerous busts and statues of prominent persons, and other works, which placed him in the front rank of French sculptors. His statue of a muscular skeleton of the human body has been often copied and used for the artistic study of anatomy. In 1785 he accompanied Franklin to the U. S., to prepare the model for the statue of Washington ordered by the State of Virginia. The statue is in the capitol at Richmond, and according to Lafayette and others is the best representation of Washington ever made. Houdon was the author of the well-known seated "Statue of Voltaire," now in the corridor of the Théâtre Français in Paris, and the bronze "Diana" now in the Louvre.

Houghton (hō'tŏn), **Henry Oscar,** 1823–95; American publisher; b. Sutton, Vt.; removed to Boston, where he worked as a compositor and as a newspaper reporter; 1849, entered the firm of Bolles & Houghton, at Cambridge; after the retirement of Mr. Bolles, 1852, established the Riverside Press; in 1864, became a member of the firm of Hurd & Houghton, book publishers, afterwards Houghton, Mifflin & Co.

Houghton, Richard Monckton Milnes (Lord), 1809–85; English statesman and author; b. Tryston Hall, Yorkshire; was elected to Parliament, 1837, as a supporter of Peel; afterwards joined the Liberals under Lord John Russell; brought in the first bill for the establishment of juvenile reformatories, 1846; assisted in passing the Copyright Act; was raised to the peerage, 1863; declined office under Palmerston. Author of "Poems, Legendary and Historical," "Poems of Many Years," "Memorials of Many Scenes," "Life, Letters, and Literary Remains of John Keats," "The Real Union of England and Ireland," "One Tract More," in the Oxford controversy of the "Tracts for the Times," and other works.

Hound, term properly restricted to those dogs which hunt by following the track of the game

by scent. This definition includes the bloodhound, staghound, foxhound, beagle, harrier, and a few others, but does not include the grey-

English Fox Hound.

hound. Most hounds are muscular, strong, sagacious animals, with large pendulous ears. The more important varieties are described under their respective titles.

Hound'fish, name given to some of the small species of sharks, such as the *Galeus mustelus*, or smooth houndfish of European seas, 2 or 3 ft. long, represented in American Atlantic waters by *G. canis*, a rather larger fish. These fishes have flat, grinding teeth, adapted well to their food, which consists of crustaceans and mollusks.

Hour, measure of time equal to a twenty-fourth part of a mean solar day, or this proportion of the period between sunrise and sunrise at the time of the equinoxes. Thus applied, it becomes a definite measure; but as employed by the ancients to designate a twelfth part of the natural day, it was an indefinite period, varying with the times of rising and setting of the sun, times which continually change with the season, and between increasing extremes as the observations are made in higher and higher latitudes. The division of the night as well as the day into twelve equal parts was not practiced by the Romans until the time of the Punic wars. Hours are now reckoned in common practice in two series of twelve each, from midnight to midday, and from this to midnight, which corresponds to the supposed divisions of the ancient Egyptians. Astronomers reckon twenty-four hours from one midday to the next.

Hour Cir'cles, great circles of the sphere, passing through the poles, and consequently perpendicular to the equator. They are meridians at every twenty-fourth part of the circumference, their planes thus making angles of 15° with each other.

Hour'glass, contrivance much used before the invention and introduction into general use of clocks and watches, for the measurement of time; consists of a hollow glass vessel blown into a form externally resembling the figure 8, or presenting the appearance of two spherico-conoidal bulbs united at their vertices. In the blowing, the contraction in the middle is such as almost to close communication between the bulbs. This passage is then smoothly drilled out, and a quantity of fine and dry sand is then introduced, sufficient to occupy an hour in running through this passage from one bulb to the other when the instrument is held in a vertical position. Half-hour glasses, minute-glasses, half-minute glasses, etc., are constructed on the same principle. The hour glass is now rarely used, more accurate and convenient time keepers having superseded it; but a glass running out in from fifteen to thirty seconds is still employed at sea to time the running of the log line.

Houris (how'rīz), celestial and voluptuous beauties, whose never-palling companionship constitutes a part of the faithful Mussulman's reward and felicity in paradise. Each believer has as his portion seventy-two of these exquisite beings, always virgins. The common Mussulmans accept these statements literally, but their more learned doctors often assert that the houris are but allegorical representations of the spiritual beatitude of the elect.

Housatonic (hō-sā-tŏn'ĭk) **Riv'er,** stream which rises by several head streams in Berkshire Co., Mass., flows S., and traverses the State of Connecticut, falling into Long Island Sound, in lat. 41° 9′ 5″ N., lon. 73° 5′ 53″ W. For 14 m. it is a tidal stream. It affords water power for numerous manufactories, and its valley abounds in wild and beautiful scenery.

House, a dwelling; in a more extended sense, a building for some other purpose which is generally expressed, as a *banking house*, a *house of prayer*. In its usual sense, as a *dwelling place* for man, the word implies considerable size and permanence; thus an Eskimo *igloo* (hut made of snow blocks), or a N. American Indian *teepee* is not called a *house*, and even a small building with four walls and a roof is often called a *hut*, a *hovel*, or a *shanty* rather than a house. Many families of negroes in the W. Indies construct dwellings having as the main uprights the trunks of six slender palm trees, across which are nailed or lashed other tree trunks or boards, and the whole parallelogram is then roofed with branches or the like, and thatched with cocoanut leaves. The spaces between four of the uprights are then inclosed with screen work made of the stems of vines, etc. Hammocks are slung from one upright to another; there is no other floor than the pounded earth; the cooking place is a circle of stones outside of the house, or perhaps a bed of sand brought from the seashore.

The first step toward greater elaboration is generally in providing necessary huts for storage of provisions, or weapons and utensils, than in making the dwelling itself more convenient. Even when domestic animals have to be sheltered, it is usual to provide such shelter under the same roof with the family. An obvious opportunity to use the space under the sloping roof caused another floor to be put in, resting on the top of the walls, and the garret

was created. Many peoples in the condition of lower barbarism or of higher savagery have built their houses in closely connected masses, many dwellings forming one large structure. The term *communal dwellings* has been applied to these.

Cellar and garret alike are the growth of a colder climate. In regions where men have little to fear from cold they live on the surface of the ground. If we visit a town in tropical S. America, we find on entering even large houses, two living rooms, a few steps above a street, between which is a passageway leading to an open court, two or three steps higher. Back of this, and still higher, are the stables and other offices, and finally we go up several steps to a back street. The kitchen is a half-inclosed shed, and the eating place is a corner of the court sheltered by an awning. The houses of the ancients all have this peculiarity, that the principal rooms are directly on the ground.

In the houses of Egyptians, Greeks, and Romans alike, light was admitted rather by means of a central roof opening than through windows in the outer walls. In the earliest buildings which we are able to study the living room itself seems to have taken its light from the roof. In the small houses of early times this living room was practically the house; in larger ones diminutive bedrooms and store rooms opened into the large room; in still larger houses, and in later times, this sitting room became a court, with the central roof opening enlarged, and the roofs in part pitched inward so as to throw rain water into a cistern in the middle, while trees and flowering plants adorned its borders, and busts on pedestals and statues adorned this living room become a handsome court. Again, in the villas of the rich, this *aule* or *atrium*, with its adjoining rooms, was added to by a much larger open-air space, the *peristyle* with its garden; and summer rooms freely opened on this. Second-story rooms were very common, but they were not generally of great importance. Only in the crowded great cities, and notably in Rome, was the three- or four-story house in common use. There it took the place of the one-room and two- and three-room dwellings of which so many are found at Pompeii; space on the level street was lacking for these, and the apartment house grew up to offer its rented tenements on higher levels. In these dwellings the window, as we understand it in modern times, must of course have been the usual means of receiving daylight; in better houses and in later times these were glazed, otherwise they were closed with shutters only, as so many windows in Italy, even in towns, were closed, down to the middle of the nineteenth century.

The houses of Damascus, Cairo, Algiers, Fez, and other towns of the warmer Mediterranean lands are not unlike the Roman country house, except in the common adoption of the flat roof surrounded by parapets, and much used as a place for sleeping at night.

The true modern European city house, four or five stories high, many windowed and steep roofed, is the creature of the Middle Ages and of the populous walled cities of that stormy time. The admission of light at the roof was difficult in a rainy climate; accordingly, the central court became a mere yard, not used except as a yard, the windows of the rooms opening on it being glazed and shuttered just like those in the street walls; but under these changed conditions the court continued in use. The country house of the Middle Ages was a very different thing from the city house; being more or less fortified. In England the *manor house* and the farmhouse existed at least from the thirteenth century very much as they exist to-day. The changed standard of comfort and the great advance in industrial resources have given the modern separate houses, well lighted and easily warmed.

House'hold Suf'frage, in Great Britain, the right of voting for members of Parliament granted to every male inhabitant of full age of a borough who has occupied for a year, either as owner or tenant, any dwelling house within the borough or county and has paid the poor rates. The right is extended to lodgers occupying lodgings of the clear yearly value, if let unfurnished, of £10 a year and upward.

House'leek, herb of the order *Crassulaceæ*; a native of Europe, often cultivated in the U. S.; takes its name from the fact that it is often set on the roofs of cottages, where it grows well. The plant was once so highly es-

COMMON HOUSELEEK.

teemed as a cure for disease that Charlemagne by edict compelled his subjects to keep it in their houses and plant it on their roofs. The name houseleek is popularly applied to several other crassulaceous plants. In the U. S. the common kinds of houseleeks are called hen and chickens and Adam and Eve.

Houssaye (ô-sä'), **Arsène**, 1815–96; French author; b. Bruyères; served in the French army in his youth; settled in Paris, where he lived for some years in extreme poverty; became connected with the *Paris Review*, 1838; was director of the Théâtre Français, 1849–56; became inspector general of works of art

and museums, 1856; works include "History of Flemish and Dutch painting," "Gallery of Portraits of the Eighteenth Century," "History of French Art," "The Three Duchesses," and other novels, several volumes of poems, and several comedies.

Houssaye, Henri, 1848– ; French historian and critic; b. Paris; son of Arsène Houssaye; during the Franco-Prussian War was an officer in the Garde Mobile; took part in many battles; and was made a chevalier of the Legion of Honor; crowned by the French Academy, 1874; works include "History of Alcibiades and the Athenian Republic," "History of the Conquest of Greece by the Romans," "The First Siege of Paris," "History of Apelles," "History of the Campaign in France and the Fall of the Empire."

Houston (hū'stŏn), **Samuel,** 1793–1863; American military officer and statesman; b. Rockbridge Co., Va.; removed to Tennessee; 1813, enlisted, in the U. S. army and served under Gen. Jackson in his campaign against the Creeks; member of Congress, 1823–27; Governor of Tennessee, 1827–29; lived among the Cherokees and became their agent at Washington; was a member of the so-called "General Consultation" in Texas, 1835, convened for the purpose of establishing a provisional government; on the demand of Santa Anna, President of Mexico, that the Texans surrender their arms, was appointed commander in chief of the Texan army, and defeated Santa Anna at San Jacinto, 1836; was first President of Texas, 1836–38; member of the U. S. Senate, 1846–59; elected Governor of Texas, 1859, but was deposed, 1861, for refusing to take the oath of allegiance to the Confederate Govt.

Houston, capital of Harris Co., Tex.; on the Buffalo bayou, 55 m. NW. of Galveston. By the bayou, which is navigable from the foot of Main Street and has been improved greatly by the U. S. Govt., the city is directly connected with the Gulf of Mexico and the Atlantic Ocean. It is here spanned by seven iron bridges. The noteworthy buildings are the city hall and market house, cotton exchange, U. S. Govt. building, Masonic Temple, and Houston Academy (Baptist). Oil mills, the machine and car shops of several railways, cotton compresses, breweries, a car-wheel factory, a furniture factory, and numerous smaller industries give employment to more than 5,000 persons. Large quantities of cotton, sugar, and corn are shipped from here. The discovery of fuel oil at Beaumont, a town within two hours' ride of Houston, added greatly to its importance as a manufacturing city. Pop. (1906) 58,132.

Hovedon (hŭv'dĕn), **Roger of,** English chronicler who flourished in the twelfth century. He seems to have belonged at one time to the household of Henry II. His "Chronicle" begins where that of Bede ends, 732, and breaks off abruptly, 1201.

Hovey (hŭv'ĭ), **Charles Mason,** 1810–87; American horticulturist; b. Cambridge, Mass.; was editor of Hovey's *Magazine of Horticulture,* which ran through thirty-four volumes, and author of "Fruits of America"; originated the Hovey strawberry, which marked the beginning of profitable strawberry culture in the U. S.

Howard, Catharine, 1520–42; Queen of England; daughter of Edmund Howard, third son of Thomas Howard, Duke of Norfolk; became the fifth wife of Henry VIII, August 8, 1540, he having been divorced from Anne; was convicted of adultery before and after marriage, after a full confession before the House of Lords, and was decapitated, February 13, 1542.

Howard, John, 1726–90; English philanthropist; b. Hackney; settled at Cardington Bedfordshire, 1758; made himself conspicuous by his schools and model cottages for the peasantry; was elected sheriff of the town, 1773; visited the jails of the United Kingdom, investigating abuses and conditions, and presented, 1774, a report to the House of Commons, which resulted in the passing of reform bills; also visited the prisons on the Continent, and published a report and supplements to the same; in 1785 started on a tour of inspection of the lazarettos of Italy, Turkey, and Asia Minor, and on his return published "An Account of the Principal Lazarettos of Europe"; started, 1789, on a tour of Asia for a similar purpose, but at Kherson, Russia, caught infection from a fever patient for whom he had prescribed and there died.

Howard, John Eager, 1752–1827; American military officer; b. Baltimore Co., Md.; served throughout the Revolutionary War, and was present on most of the important battle fields, attaining the rank of lieutenant colonel, and receiving a medal from Congress for his valor at the Cowpens, 1781; was a member of Congress, 1787–88; Governor of Maryland, 1789–92; declined a position in Washington's cabinet, 1796; was U. S. Senator, 1796–1803; was appointed a brigadier general by Washington, 1798; and was a candidate for Vice President, 1816.

Howard Univer'sity, institution of liberal learning in Washington, D. C., established in 1867, primarily for the education of freedmen, and named in honor of Gen. O. O. Howard, then in charge of the Freedmen's Bureau. The value of the property is about $1,000,000, and there is a general endowment fund of $175,000. Pupils are admitted without distinction of sex or color. The institution is nonsectarian. Besides the college course the university includes dental, law, medical, normal, pharmaceutical, and theological departments. In 1909 the number of instructors was 96, of students, 1,100.

Howe, Elias, 1819–67; American inventor; b. Spencer, Mass.; went, 1835, to Lowell, and worked there, and afterwards in Boston, in machine shops; in 1845 completed a sewing machine, and patented it, 1846; spent two years of unsuccessful exertion in England, striving in vain to bring his invention into notice; returned to the U. S., in almost hope-

less poverty, to find that his patent had been violated; but at last found friends who assisted him, and made good his claims in the courts, 1854.

Howe, Joseph, 1804–73; Canadian statesman and journalist; born Halifax; son of a Loyalist printer from Boston. Became, 1828, proprietor and editor of *The Nova Scotian*, to which he contributed several remarkable sketches and articles. Elected to local Parliament, 1836; fought for Responsible Government for his province, and won it; entered Executive Council, 1840; was Secretary of State for Dominion, 1870; Governor of Nova Scotia, 1873.

Howe, Julia (Ward), 1819– ; American author; b. New York; was married, 1843, to Dr. S. G. Howe, the philanthropist, and was associated with him in editing the Boston *Commonwealth*, an antislavery journal; lectured on social subjects and preached in Unitarian pulpits; was made LL.D. by Brown Univ., June, 1909, at the age of ninety. Her "Passion Flowers," "Words for the Hour," and "Later Lyrics" contain her most important lyric poems, the best known of which is "The Battle Hymn of the Republic." "The World's Own" and "Hippolytus" are dramas. Among her other publications are "Modern Society," a "Life of Margaret Fuller," and "Sex in Education."

Howe, Richard (Earl), 1725–99; British naval officer; b. London; third son of the second Viscount Howe; became a midshipman under Anson, 1739; post captain for gallantry at Fort William, 1745; captured Cherbourg and Martignan, 1758; succeeded his brother as viscount (Irish peerage), 1758; defeated Conflans, 1759; treasurer of the navy, 1765; rear admiral of the blue, with chief command in the Mediterranean, 1770; fought d'Estaing off Rhode Island, 1778; became admiral and viscount in the British peerage, 1782; relieved Gibraltar, 1782; first lord of the admiralty, 1783; created earl, 1788; took command of the Channel fleet, 1793; defeated the French off Brest, 1794; K. G. and general of marines, 1795.

Howe, Samuel Gridley, 1801–76; American educator and philanthropist; b. Boston; studied medicine; went to Greece, 1824, and fought in the war of independence; returning, 1827, procured large contributions of supplies, which he distributed to the Greek army; went to Europe to study asylums for the blind in England, France, and Germany, and on his return became, 1832, the head of the Perkins Institute for the Blind in Boston; also devoted much attention to the education of idiots, and distinguished himself in his labors for the antislavery cause. Author of "Historical Sketch of the Greek Revolution" and "Reader for the Blind." Dr. Howe was the leader in establishing schools for the blind in the U. S.

Howe, William (Viscount), 1729–1814; British military officer; brother of Richard, Earl Howe; served at Quebec under Wolfe; took the chief command in N. America, 1775, after Gage's departure, Howe having previously commanded at Bunker Hill; evacuated Boston, March, 1776; gained the battle of Long Island, August 27th; occupied New York, September 15th; won the victory of White Plains, October 28th; of Fort Washington, November 16th; of Brandywine, September 11, 1777; occupied Philadelphia, September 26th; repulsed Washington at Germantown, October 4th; was superseded by Sir Henry Clinton, 1778; became a lieutenant general, 1782; general, 1786; succeeded to the Irish peerage as viscount, 1799.

Howells, William Dean, 1837– ; American author; b. Martinsville, Ohio; son of a printer; was editorially connected with the Cincinnati *Gazette*, and Ohio State *Journal*; U. S. consul at Venice, 1861–65; assistant editor of the New York *Nation*, 1865–72; editor in chief of *The Atlantic Monthly*, 1872–81; occupant of "The Editor's Study" of *Harper's Magazine*, 1886–92; later had charge of "The Easy Chair," same periodical; works include "Venetian Life," "Italian Journeys," "Tuscan Cities," "Modern Italian Poets," "A Boy's Town," "My Literary Passions," "Literature and Life," "Literary Friends and Acquaintances," "London Films," and the works of fiction "A Chance Acquaintance," "A Foregone Conclusion," "The Lady of the Aroostook," "A Modern Instance," "A Woman's Reason," "The Rise of Silas Lapham," "The Minister's Charge," "A Hazard of New Fortunes," "The Sleeping Car and Other Farces," "The Mouse Trap and Other Farces," "The Quality of Mercy," "A Traveler from Altruria," "The Landlord at Lion's Head," "Ragged Lady."

How'itt, Mary, 1799–1888; English author; b. Uttoxeter; daughter of a Mr. Botham, a Quaker; married, 1823, William Howitt, author; wrote many poems, hymns, and ballads, some novels, and instructive books for the young; translated Miss Bremer's works and some of those of H. C. Andersen, and was with her husband joint author of "The Literature and Romance of Northern Europe."

Howitt, William, 1798–1879; English author; b. Heanor, of Quaker stock; left the Society of Friends, 1847, having become a spiritualist. His first books were written partly by his wife, Mary Howitt; also published a "History of Priestcraft," "Rural Life in England," "Student Life in Germany," "Land, Labor, and Gold," an account of his experiences in Australia, "History of England," and translations from the German.

How'itzer, short cannon for firing shells *horizontally*, differing in this from the *mortar*, which is used for *vertical fire*. Guns of a construction similar to the howitzer, and used for firing stone projectiles, are described by military historians as used in the fifteenth century. On the successful manufacture of shells by the Dutch artillerists in the sixteenth century the howitzer was naturally developed from the mortar, and soon became of general use, except by the French. The first cannon cast by the colonial authorities of America were 8-in. and 24-pounder brass howitzers, some of which are now preserved. The Russians, 1777, introduced the licorne, an improved howitzer.

Smooth-bore howitzers, except for siege and mountain service, were displaced in the U. S. by guns equally suitable for shell firing in field or garrison service, but rifled howitzers, especially of large calibers, are an important part of modern artillery.

Howl'ing Mon'key, name given to S. American monkeys of the genus *Mycetes*, from the hideous howls they utter, especially at night. The howling monkeys have long hair, strong, prehensile tails, and well-developed thumbs. They are the largest of the S. American monkeys. There are ten or twelve species.

Howrah (how'rä), city of Bengal, British India; on the Hoogli, opposite Calcutta; is the industrial suburb of this metropolis, and is the terminus of the great railway system from the W. In 1785 it was a small village. Pop. (1901) was 157,594.

Hox'ie, Vinnie (REAM), 1846– ; American sculptor; b. Madison, Wis.; removed to Washington, D. C.; married Richard S. Hoxie, U. S. army; executed busts of Gen. Grant, Thaddeus Stevens, Albert Pike, John Sherman, Reverdy Johnson, and others; after producing various works, chiefly ideal, made the statue of Lincoln at the National Capitol, being the first statue ordered by the Government from a woman; other works include "The Indian Girl," "America," "Miriam as She Met the Children of Israel as They Crossed the Red Sea," "The Spirit of Carnival," and "Sappho," and the statue of Admiral Farragut, in Farragut Square, Washington.

Hoyle, Edmond, 1672–1769; English writer on games; is said to have been called to the bar, but little is known of his life; gave lessons in playing whist and other games, and was the first to write scientifically on any card game.

Hoyt, Jehiel Keeler, 1820–95; American author; b. New York City; published the first American translation of Jules Verne's "Journey from the Earth to the Moon," compiled "Encyclopædia of Practical Quotations" (with Anna Ward), and "Quotable Shakespeare."

Hrotsvitha ((hrōts'vē-tä), or **Roswitha** (rōs'-vē-tä), abt. 935–75; German poet and dramatist); was of noble Saxon family; entered young the convent Gandersheim; was the first woman of the Germanic race to produce works of literary art. Her works, collected and arrayed by herself in three books, include six dramas commonly known by the names of the chief personages of each, "Gallicanus," "Abraham," "Sapientia," etc. These were not intended for the stage, but for reading.

Huaca (wä'kä), Peruvian word, signifying something sacred, applied particularly to sepulchral mounds. After the conquest the tombs were violated and were found to contain vast treasures, more than $900,000 in gold and silver having been taken from a single huaca. The name huaca, as applied to aboriginal graves containing treasure, has extended to provinces adjacent to Peru.

Huaina Capac (wä-ē'nä kä'päk), also written HUAYNA CAPAC, or CCAPAC, d. 1525; eleventh and one of the greatest of the Inca rulers of Peru; reign began 1480 (other accounts say 1491); completed and consolidated the immense conquests of his father, Tupac Inca Yupangui; defeated the armies of Quito in a sanguinary battle; and carried his arms far S. into Chili; the Inca Empire thus attained its greatest extent and glory. His domains were divided between his two sons, Huascar and Atahualpa.

Huallaga (wäl-yä'gä), river of Peru; a S. branch, or the head of the Amazon; rising in a swamp on the side of the Pucayaco Mountains, about 1 m. N. of Cerro de Pasco, and nearly 15,000 ft. above the sea; flowing in a general N. direction, to its confluence with the Marañon; length along the main curves, 700 m.; is navigable for river steamers to the Pongo de Aguirre, 285 m. from the mouth.

Huaraz (wä'räs), capital and largest city of the department of Ancachs, Peru; on the Huaraz River; 9,931 ft. above the sea. A railway, following down the river valley 165 m., connects it with the port of Chimbote, and is the outlet of an important agricultural and mining district; there is a large trade in transit with the interior. Pop. (1900) 17,000.

Huascar (wäs'kär), abt. 1495–1533; Inca sovereign of Peru; b. probably at Cuzco; was the son and legitimate heir of Huaina Capac; inherited only the S. part of the empire, beginning his reign at Cuzco, 1525; his illegitimate brother, Atahualpa, retained the province of Quito. War between the two lasted several years; Huascar was finally defeated and captured, 1532, and the whole empire fell into the hands of the conqueror, who was himself captured soon afterwards by Pizarro. Atahualpa feared that the Spaniards would interfere in favor of his brother, and by his order Huascar was drowned at Andamarca.

Hubbard, Joseph Stillman, 1823–63; American astronomer; b. New Haven, Conn.; was employed by Capt. John C. Frémont to reduce his Rocky Mountain observations, 1845; appointed a Prof. of Mathematics in the U. S. navy, 1845; assigned to duty in the Naval Observatory at Washington, where he remained until the time of his death; was a frequent contributor to *The Astronomical Journal*, which contains his elaborate investigations on Biela's comet, as also those on the great comet of 1843, on the orbit of Egeria, and on other subjects.

Hub'bardton, town of Rutland Co., Vt.; 48 m. SW. of Montpelier; is noted for a battle between the British and Americans, July 7, 1777. The latter, numbering 1,000, under Colonels Warner, Francis, and Haile, the rear guard of Gen. St. Clair, were attacked and defeated by superior forces under Gen. Fraser, losing 30 killed and 294 wounded and prisoners. The British acknowledged a loss of 183 killed and wounded. Col. Francis was mortally wounded, and Col. Haile with his 300

men withdrew from the field without coming into action.

Huber (ü-bär'), **François**, 1750–1831; Swiss entomologist; b. Geneva; at the age of seventeen became totally blind, owing to intense application and study; by the aid of his wife and that of an intelligent servant, prosecuted his studies in natural history, devoting himself particularly to bees; made many important discoveries, regarding the fertilization of the queen bee, the fact of the yearly massacre of the drones, the uses to which the bees put their antennæ, the method of ventilating the hive, the fact that workers are of two kinds, etc. The record of his work he first gave to the world under the title "Letters to Charles Bonnet," 1792; new edition, "New Observations upon Bees," 1796. His son JEAN PIERRE also wrote on the "Habits of Bees."

Hubli (hö'blē), town and railway junction in the Darwar district, Bombay, British India; 13 m. SW. of Darwar; is in the center of the cotton trade of the S. Mahratta country, and has important factories of silk fabrics and copper utensils. The Jains are numerous here, and have many fine ancient temples in the suburbs. Pop. (1901) 60,214.

Hub'meyer, or **Hüb'maier**, **Balthasar**, abt. 1480–1528; German clergyman; b. Friedberg, near Augsburg; became Prof. of Theology in Ingoldstadt, 1512, and, 1516, preacher at the Cathedral of Regensburg, whence he removed, 1523, to Waldshut. Here he became a Protestant, but soon began to develop separatist ideas. He taught that baptism ought not to take place until the full-grown man demands it as the external symbol of his faith. The Austrian Govt. interfered, and he fled, 1525, to Zurich. Imprisoned and persecuted here also, he went to Nikolsburg, in Moravia, where he formed a large Anabaptist congregation. When, at the death of Ludwig of Hungary, Moravia fell to Ferdinand of Austria, Hubmeyer was seized, carried to Vienna, sentenced to death, and burned at the stake.

Huc (ük), **Évariste Régis**, 1813–60; French missionary and traveler; b. Toulouse; entered the order of the Lazarists and took holy orders, 1839; immediately after set out for Macao, China; after studying the Chinese language and adopting the Chinese costume traveled from Canton through the interior to Pekin; later visited Mongolia and Tibet, where he studied the Tibetan language and Buddhist literature; after further travels, through the S. of China, returned to Paris, 1852; published "Souvenirs of a Journey through Tartary, Tibet, and China," "The Chinese Empire," and "Christianity in China, Tartary, and Tibet."

Huc'kleberry and **Blue'berry**, names applied to the N. American representatives of the whortleberry of Europe. Huckleberry bushes are ericaceous shrubs of the genera *Gaylussacia* and *Vaccinium*. *G. brachycera*, *dumosa*, *frondosa*, *resinosa*, and *ursina* furnish mostly hard and dark colored fruits, which in some localities are known distinctively as huckleberries; the blueberries, generally lighter colored, softer, and sweeter than the huckleberries, are the fruits of *V. pennsylvanicum*, *canadense*,

SWAMP HUCKLEBERRY

vacillans, *corymbosum*, and other species. See WHORTLEBERRY.

Hud'dersfield, town in Yorkshire, England; at the confluence of the Holme and the Colne; 26 m. NE. of Manchester; it has very large manufactures of cloths, kerseymeres, flushings, and serges; extensive coal mines in the vicinity; is connected by canals with the Mersey and the Humber, and forms the center of an extensive railway system; is the principal seat of the fancy woolen trade in England, comprising shawls, waistcoatings, etc., of the finest fabric and the most elegant patterns. It is well built, and has many good educational institutions. Pop. (1901) 95,050.

Hud'son, **Henry**, or **Hendrik**, English discoverer of whose birth and early history nothing is known. In 1607 he made a voyage in search of the NW. Passage; 1608 sailed to Nova Zembla; and, 1609, in the service of the Dutch India Company, sailed in the *Half Moon* for Davis Straits; but reached Cape Cod, went to Chesapeake Bay, and discovered the Hudson River, up which he sailed as far as where Albany stands. In 1610 he sailed again in an English ship, discovered Hudson Strait and Hudson Bay, in which he wintered; but his crew became mutinous and set him, with his son John and seven infirm sailors, adrift in a shallop, after which he was never heard of. A part of his crew arrived in England, 1611. Hudson published "Divers Voyages and Northern Discoveries," and "A Second Voyage." In 1909, the tercentenary of his discovery of the Hudson River and the centenary of the inauguration of steam navigation on that river, were commemorated in New York by a large celebration in which a representation of the *Half Moon* figured.

Hudson, **Henry Norman**, 1814–86; American Shakespearean scholar; b. Cornwall, Vt.; taught in Kentucky, Alabama, and elsewhere, and became a lecturer on Shakespeare; in

1849 was ordained in the Protestant Episcopal Church; was for a time editor of *The Churchman*; rector of a church at Litchfield, Conn., 1859–60, and was an army chaplain during the Civil War; published "Lectures on Shakespeare," an edition of Shakespeare, "Shakespeare, his Life," etc.; was Prof. of Shakespearean Literature in Boston University.

Hudson Bay, inland sea of Canadian Dominion, between lat. 51° and 64° N., and lon. 77° and 95° W.; is of irregular shape, 850 m. long N. and S., and 600 m. broad. Its S. extremity is called James Bay. At the NE., through Hudson Strait, it communicates with Davis Strait. Navigation is possible only during a few months of the year, the bay being completely frozen over or obstructed by drift ice the rest of the time.

Hudson Bay Com'pany, last of the great English commercial corporations; was chartered May 2, 1670, by Charles II, and ceased to exercise its monopoly June 23, 1870, after two hundred years of authority in the N. parts of N. America. For many years after its foundation the French were in possession of Canada. The NW. Company of Montreal was a formidable rival from 1783 to 1821, when the younger company was merged into the older. The principal trade of the company was in furs, and it was uniformly a profitable trade. It originally possessed a proprietorship and a monopoly of trade throughout Rupert's Land, as the land whose streams flow into Hudson Bay was called. In 1821 this jurisdiction (with the original authority to govern and also to make war on savage nations) was extended to the Pacific—the authority for the new territory to last only for periods of twenty years by royal license. From 1849 to 1859 Vancouver Island was also licensed to this company. After 1859 the company had no monopoly W. of the Rocky Mountains. In 1868 the company was authorized by the British Parliament to surrender its powers and rights to the crown and incorporate its territories with the Dominion of Canada. In 1869 this was carried out, and 1870 the full transfer was accomplished.

Hudson Riv'er, called also NORTH RIVER in its lower course, river of the U. S.; rises some 3,000 ft. above tide water in Essex Co., N. Y., among the Adirondacks. After a devious course among the mountains, it is joined by the Schroon River, and 10 m. farther on by the Sacondaga. Thence its course is generally E. to Sandy Hill, from which point its flows almost due S. to its mouth. The Batten Kill and Hoosick join it from the E. At Cohoes it receives the Mohawk, which more than doubles its volume. Three m. below, at Troy, it becomes a navigable tidal stream. Above this it is chiefly noteworthy for its romantic scenery and its great and unfailing water power. The largest affluent received below Troy is the Walkill. There are twenty-one lighthouses and lighted beacons built by the National Government on the banks. The river is navigable 117 m. to the city of Hudson for ships of the first class, and to Troy, 166 m., for steamboats and schooners. Thirty miles below Troy the river approaches the remarkably fine scenery of the Catskill Mountains. At Newburg, 60 m. from New York, the Hudson enters the Highlands, through whose impressive scenery it flows for 20 m. Below Verplanck's Point the river expands into Haverstraw Bay and the Tappan Sea, a noble, lakelike expansion. Below, the W. bank of the river is marked by the Palisades, a precipice of lofty trap rock, at some points 500 ft. high. The fisheries of the Hudson are of considerable importance. Shad, bass, and sturgeon are extensively taken, and several species of fish native to the St. Lawrence basin have naturalized themselves in the Hudson since the opening of the Champlain and Erie canals. The Erie Canal connects the river with Lake Erie, the Champlain Canal with Lake Champlain, the Delaware and Hudson with the Pennsylvania coal regions. The river is thus the thoroughfare for large numbers of canal and freight boats to and from New York and the neighboring cities. The waters of the Hudson enter the inner bay of New York, flowing between New York City and Jersey City on the E. and W. respectively. The river is about 300 m. in length. It was named in honor of Henry Hudson, its first European explorer. There are several tunnels beneath the river, connecting the borough of Manhattan with the New Jersey shore.

Hudson Strait, in British N. America, connects Hudson Bay with Davis Strait and the ocean, between lat. 60° and 64° N., and lon. 65° and 77° W.; length, 450 m.; average breadth, 100 m.

Hué (hō-ā'), capital of Annam; fortified town on the Tuong-tien River, about 10 m. above its entrance into the China Sea; is accessible only to small vessels, on account of the shallowness of its harbor; nevertheless it carries on a lively trade, and has considerable shipbuilding. Pop. (1901) 50,000.

Huerta (wĕr'tä), **Vicente Garcia de la,** 1730–87; Spanish poet and critic; b. Zafra, Estremadura; held the office of first librarian of the royal library at Madrid; exercised a considerable influence, both by his tragedy, "Raquel," first produced in Madrid, 1778, and made a great success, and by his collection of the best works of the elder Spanish dramatists. He also published two volumes of poems.

Huet (ü-ā'), **Conrad Busken,** 1826–86; Dutch journalist and miscellaneous writer; b. at The Hague; was a preacher of the Dutch French Reformed Church at Haarlem, 1851–62; became a writer for various periodicals; lived in Java, 1867–76, editing journals; settled in Paris; works include "Literary Phantasies," "Dutch Literature," "The Land of Rembrandt."

Huet, Pierre Daniel, 1630–1721; French scholar; b. Caen; went to the court of Christine of Sweden, 1652; became the tutor, together with Bossuet, of Louis XV; chiefly known as the originator of the Delphine editions of classical authors; became bishop, 1685; retired, 1699; works include "Lettre sur l'Origine des Romans," full of curious researches; "Censura Philosophiæ Cartesianæ,"

opposing Descartes; and "Traité Philosophique de la Faiblesse de L'esprit Humain," for which he was classed among skeptics.

Hufeland (hō'fē-länt), **Christoph Wilhelm,** 1762–1836; German physician; b. Thuringia; was Prof. of Medicine at Jena, 1793–98, and from 1809 at Berlin. His work on the art of prolonging life was translated into several languages. That on the physical training of infants produced many educational reforms. His "Enchiridion Medicum," which gives the experiences of his fifty years of practice, is still consulted. He introduced the system of mortuary houses for the prevention of burying alive, the first being erected at Weimar under his superintendence.

Hugel (hū'gĕl), **Karl Alexander Anselm von** (Baron), 1796–1870; German traveler; b. Ratisbon; served as an Austrian officer, 1813–14, and was employed in the Austrian diplomatic service; 1831–37 traveled in Greece, Asia Minor, Egypt, Barbary, and in remote portions of India and central Asia, making large collections, which were bought by the government; best known works, "Kaschmir und das Reich der Sikhs" and "Das Becken von Kabul."

Huger (ū-jē'), **Benjamin,** 1805–77; American military officer; b. Santee, S. C.; graduated at West Point, 1825; in Mexican War was chief of artillery with Gen. Scott's army; was brevetted major, lieutenant colonel, and colonel, and was presented with a sword of honor by the State of S. Carolina; commissioned major general in the Confederate service, 1861; during the campaign on the Peninsula his conduct was severely censured, and he was removed from active service.

Hug'gins, Sir William, 1824– ; English astronomer; b. London; erected an observatory near his residence at Upper Tulse Hill, 1855, and at first was occupied with observations of double stars, but later gave his almost entire attention to the application of spectrum analysis to the examination of comets and nebulæ. In 1862 he spent several months in mapping the spectra of twenty-six chemical elements, of which the results are published in the *Philosophical Transactions* for 1864. He made valuable observations on the solar prominences, showing how their forms may be seen, and detected the heat received at the earth from some of the fixed stars. He became president of the British Association, 1891; president of the Royal Society, 1900–5.

Hughes (hūz), **Ball,** 1806–68; American sculptor; b. London; made busts of George IV and the dukes of York, Sussex, and Cambridge; settled in New York, 1829; made the marble statue of Hamilton for the Merchants' Exchange, destroyed by fire, 1835; also the high relief of Bishop Hobart in Trinity Church; later moved to Dorchester, Mass. The "Little Nell" and "Uncle Toby," in plaster, in the Boston Athenæum, are his work, and the bronze statue of Dr. Bowditch in the cemetery of Mt. Auburn. Other works are a bust of Washington Irving, a "Crucifixion," and a model for an equestrian statue of Washington.

Hughes, David Edward, 1831–1900; American inventor; b. in London; early removed to the U. S., where, 1855, he patented a system of printing telegraph. (See HOUSE, ROYAL EARL.) His instruments were adopted by the French Govt., 1861, in Italy, 1862, in England, 1863, and eventually in Russia and other European countries. In 1878 he announced his discovery of the microphone; 1879 that of the induction balance; was elected fellow of the Royal Society, 1880, and received numerous orders of knighthood, medals, and other honors.

Hughes, John, 1797–1864; American prelate; b. Annalogham, Ireland; emigrated to the U. S., 1817; worked for a time as a gardener and nurseryman; ordained in the Roman Catholic Church, 1826; held pastoral charges in Philadelphia, 1826–38, where he founded St. John's Asylum, 1829, and established *The Catholic Herald*, 1833. In 1838 he was made Bishop of Basileopolis *in partibus*, and coadjutor to Bishop Dubois, of New York; 1842, became full bishop of that diocese; 1839, founded St. John's College, Fordham, and, 1850, was made Archbishop of New York. In 1839–42 he was prominent in the struggle of the Roman Catholics against the public-school system of New York, and, 1851, had a famous controversy with Erastus Brooks respecting the tenure of church property. In November, 1861, at the solicitation of Pres. Lincoln, he went to Europe in company with Thurlow Weed, in order to secure the friendly neutrality of some governments, particularly of the French court.

Hughes, Thomas, 1823–96; English author; b. Newbury, Berkshire; was called to the bar, 1848; became queen's counsel, 1869; was in Parliament from Lambeth, 1865–68, from Frome, 1868–74; became principal of the College for Working Men and Women, London; was prominent in practical reforms and social science; aided in founding the town of Rugby, Tenn, 1880; author of "Tom Brown's School Days," "The Scouring of the White Horse," "Tom Brown at Oxford," "Alfred the Great," and other works.

Hugli (hō'glē), capital of the district of Hugli; Presidency of Bengal, British India; on the Hugli River; has a college in which both English and Asiatic literature are taught, and which was founded by a native; was once an important city, but declined with the rise of Calcutta. Pop. (1901) 29,383.

Hugli (less properly HOOGHLY) **Riv'er,** extreme W. outlet of the Ganges; formed by the confluence of the Bhagrutti and the Jellinghy, branches of the Ganges, and considered the proper mouth of this river; is about 200 m. long, 10 m. broad at its entrance into the Bay of Bengal; is navigable for the largest vessels, its draught being 17 ft. up to Calcutta. During the SW. monsoon the Bore appears here, and generally the tide is felt 17 m. above Calcutta. The waters of the Hugli are considered holy by the natives.

Hu'go, Victor, 1802–85; French poet, novelist, and dramatist; b. Besançon; son of an

officer of the empire. At the age of twenty he became famous by his "Odes et Ballades." Soon afterwards appeared his novels "Han d'Islande" and "Bug-Jargal," revealing his power as a prose writer, while his drama of "Cromwell" and his poems entitled "Les Orientales" and "Le Dernier Jour d'un Condamné" vastly increased his reputation. He was acknowledged as the leader of the Romanticists, whose contests with the Classicists reached a climax with his drama of "Hernani," 1830. His novel "Notre Dame de Paris," 1831, gave him world-wide renown. In the same year he published a volume of lyrics, "Les Feuilles d'Automne," and in rapid succession appeared "Marion Delorme," "Le Roi s'Amuse," "Lucrèce Borgia," "Marie Tudor," "Angelo, Tyran de Padoue," "Ruy Blas," and "Les Burgraves," and other successful plays; a series of exquisite poems of a political tendency; and numerous miscellanies, including a descriptive work on the Rhine. In 1841 he became an Academician; 1845, a peer; 1848, a member of the Constituent; and, 1849, of the Legislative Assembly. The *coup d'état* of December 2, 1851, drove him into exile.

He castigated Louis Napoleon in his "Napoleon le Petit" and "Les Châtiments," and was consequently obliged to remove, 1853, from the Island of Jersey to that of Guernsey, where he resided till the downfall of the second empire, 1870, repeatedly refusing to avail himself of amnesties. He was elected to the National Assembly, 1871, but resigned, having roused a storm by his vehement denunciation of the treaty of peace with Germany, and went to Brussels. Here he was mobbed for attacking the Belgian Govt. and offering in his house an asylum to the soldiers of the Commune, and was obliged to depart. In 1872 he was defeated in Paris as a candidate for reëlection, although the radical press supported him. In February, 1876, he was there elected a Senator for six years. Among his many later works are "La Légende des Siècles," a series of poems mainly epical; "Les Misérables" and "Les Travailleurs de la Mer," romances which had a prodigious success; "L'Homme qui Rit," which was too exaggerated and less successful; "L'Année Terrible," 1872, depicting the misfortunes of France; and "Quatre-vingt-treize," 1874, relating to the Revolution.

Huguenots (hū'gē-nōts), name of uncertain origin, first applied, 1560, by the Roman Catholics of France to all partisans of the Reformation, but subsequently restricted to the Calvinists. The Reformation in France was but little influenced by Luther, and before Calvin took the lead was almost entirely self-developing. The movement would probably have fallen away had not the strong hand of Calvin taken it up, 1528. At the celebrated general synod in May, 1559, Calvin's ideas of church government and discipline were formally embodied in a confession of faith. During the reign of Henry II, 1547–59, the Huguenots gathered such strength as to entertain hopes of becoming the dominant political party; several of the royal family, such as the King of Navarre, his brother the Prince de Condé, and many of the nobility, including the Châtillons and Admiral Coligni, favored the Reformation. After this, during the reigns of two successive kings whose intellectual inferiority rendered a regency necessary, Catharine de' Medici held the reins of authority, while the dukes of Guise supported by the Catholics, and the princes of Bourbon by the Huguenots, contended for the regency.

By the peace of St. Germain, 1570, full liberty was guaranteed the Huguenots, and the king's sister was given as wife to Henry of Navarre. The leading Protestants were invited to Paris to the nuptials, where on the day of St. Bartholomew, 1572, a general massacre of Protestants took place at the instigation of the queen mother. Similar massacres throughout the country followed. The Huguenots, with Henry of Navarre as leader, now battled against the Holy League formed by the Guises and Philip II of Spain. After the assassination of Henry III, 1589, he was succeeded by Henry of Navarre, who, to pacify the terrible disorders in France, became a Catholic, but secured full freedom of conscience and all political and religious rights to the Huguenots by the Edict of Nantes, 1598. The murder of Henry IV by Ravaillac, 1610, left the Protestants without a protector. Under his young son and successor Louis XIII they had again to fight for their rights, their unequal struggle ending with the reduction of La Rochelle by Richelieu. From 1629 to 1661, especially under Mazarin, there was comparative rest. After the death of Mazarin several edicts were again published in rapid succession which aimed at reducing and finally exterminating the Huguenots. In 1685 Louis XIV published the celebrated revocation of the Edict of Nantes, on which occasion at least 500,000 Protestants took refuge in foreign countries, many of them in America. From this time, for many years, their cause was completely broken in France, although in the mountains of the Cévennes the religious peasants, under the name of Camisards, for a time defied the royal troops. The Protestant Church was at length reorganized by Jean Court, and finally the revolution restored to the Protestants their full rights, which have been substantially respected by all the succeeding governments of France. The term Huguenot has long ceased to be the common name of the church, which is now known as the Reformed Church of France.

Hulin, or **Hullin** (ü-lăñ'), **Pierre Augustin** (Count), 1758–1841; French military officer; b. Paris, France; distinguished himself at the storming of the Bastile, 1789; was appointed captain of the National Guard same year, but falling under the suspicion of Robespierre on account of his moderation, was imprisoned. Liberated on the fall of Robespierre, he entered the Italian army; was made a general of division, 1802; presided over the court-martial which sentenced the Duke of Enghien to death, 1804; was military governor of Vienna 1806, of Berlin 1807, of Paris 1812, and was created a count, 1808.

Hull, Isaac, 1773–1843; American naval officer; b. Derby, Conn.; became lieutenant U. S. navy, 1798; was made first lieutenant of the frigate *Constitution*, 1801; served with distinction in the Barbary expeditions; and was promoted to the rank of captain, 1806; while in command of the *Constitution*, 1812, was chased by a British squadron of five ships for three days, but escaped by bold and ingenious seamanship. On August 19th he encountered the frigate *Guerrière*, Capt. Dacres, one of his late pursuers, and fought her for half an hour at close quarters, when she surrendered. For this, the first naval victory of the war, Hull received a gold medal from Congress, and swords and silver plate from several states; was afterwards made a naval commissioner, had command of the Pacific and Mediterranean squadrons, and was at the head of the Washington and Boston navy yards.

Hull, William, 1753–1825; American military officer; b. Derby, Conn.; served with distinction throughout the Revolutionary War, in which he rose from the rank of captain to that of colonel; became a very successful lawyer of Newton, Mass.; was major general of militia in Shays's insurrection; commissioner to treat with the Indians of upper Canada, 1793; became a judge of Common Pleas; Governor of Michigan Territory, 1805–14. As brigadier general commanding the Army of the Northwest he surrendered Detroit to Gen. Brock, for which he was found guilty of cowardice, and sentenced, 1814, to be shot, but was pardoned in consideration of his age and former services; published "The Campaign of the Northwest Army."

Hull. See KINGSTON UPON HULL.

Hulse'an Lec'tures, number of lectures, not exceeding six and not less than four annually, delivered at the Univ. of Cambridge, explanatory of the evidences of Christianity and of the difficulties of Scripture. There are also a Hulsean Professorship of Divinity, a Hulsean prize and scholarships, etc.; all founded by the Rev. John Hulse, 1708–90.

Hu'manism, theory of education which aims at giving symmetrical development to the intellectual and moral powers by means of the study of classical literature and art. Or, more largely, the study of the classics, or the cultivation of the *belles-lettres* in general. The word *humanism* seems to be of comparatively recent origin, hardly antedating the discussion in Germany in the end of the eighteenth century between the educational innovators, followers of Basedow, who called themselves *philanthropinists*, and the advocates of the traditional literary education based upon the study of the classics. The companion word *humanist*, however, is much older, being no other than the Italian *umanista*, the common title during the Renaissance of the adepts in the newly revived Greek and Latin learning. Both go back in the last resort to the Latin use of *humanus*, *humanitas*, as applied to liberal education. Under the influence of the Germans, humanism has more and more during the nineteenth century come to be limited in all the European languages to classical learning, as the basis of higher education.

Humanita'rians, name which sometimes designates that school of Unitarians who consider Jesus Christ to have been a mere man, without superhuman attributes. It also sometimes designates the professors of the so-called "religion of humanity."

Hum'ber, estuary of the Trent and the Ouse, having its entrance on the E. coast of England; average breadth is between 2 and 3 m., and it is navigable for the largest vessels up to Kingston upon Hull, 22 m.

Humber, river of Newfoundland; second in size, the river of Exploits being the first; rises in Adie's Pond, flows NE. toward White Bay, then turns SW., and after receiving the outflow of Grand Lake and passing through Deer Pond, turns W. and reaches the Bay of Islands on the French shore, through an estuary called Humber Arm; length about 75 m.

Hum'bert I, 1844–1900; King of Italy; b. Turin; eldest son of King Victor Emmanuel II of Italy, and of Archduchess Adelaide of Austria; accompanied his father in the War of 1859; aided in reorganizing the ancient Kingdom of the Two Sicilies; took part in the War of 1866, commanding a division and covering the retreat of the Italian army after the battle of Custozza; married, 1868, his cousin Margarita of Savoy, the only daughter of Prince Ferdinand of Piedmont, Duke of Genoa, and on November 11, 1869, a son was born, who received the name of Victor Emmanuel Ferdinand and the title of Prince of Naples. After the occupation of Rome by the Italian troops, 1870, the prince and princess took up their residence in that city. Humbert succeeded to the throne on the death of his father, January 9, 1878. During the cholera epidemic of 1884 he gained much favor by his bravery in visiting Naples and his generosity; assassinated in Monza.

Humboldt (hūm'bōlt), **Friedrich Heinrich Alexander** (Baron von), 1769–1859; German naturalist; b. Berlin; entered, 1791, the mining school at Freiberg; was a mining officer at Bayreuth, 1792–97; meanwhile making observations and experiments in almost every field of natural science; spent five years (1799–1804) in Central and S. America, where he made astronomic, meteorologic, climatologic, and magnetic observations; made collections of plants, etc.; settled in Paris, and there arranged and published his scientific acquisitions, which appeared in twenty-nine volumes, with upward of 2,000 illustrations, and gave new impulses to every branch of science. In 1827 he removed to Berlin at the solicitation of the king. In 1829 he directed an expedition to central Asia. His chief work is "Cosmos," a striking and attractive description of the numberless varieties of forms which the world contains, but representing the world as one consistent existence. Other works include "Central Asia," "Observations on Zoölogy and Comparative Anatomy," "Critical Examination of the Geography of the New Continent."

Humboldt, Karl Wilhelm (Baron von), 1767–1835; German statesman and philologist; b. Potsdam; brother of the preceding. In 1801 he was appointed Prussian ambassador at Rome, but returned, 1808, to Berlin as Councilor of State, and in that office developed great activity for the reorganization of the Prussian state, more especially for the establishment of the Univ. of Berlin, and also was minister of public instruction. In 1810 he went as minister plenipotentiary to Vienna, and played a conspicuous part in the immense diplomatic stir which accompanied and followed the fall of Napoleon. He signed the Treaty of Paris, and represented Prussia in the first German Diet. He was a member of the Prussian Council of State up to 1819, and exercised a great and beneficial influence on the development of German affairs. The Prussian king broke the promise of a representative constitution which he had given during the war against Napoleon, and under the pretext of putting down demagogism he persecuted liberty. Humboldt understood the maneuver, and fought against it with all his power. Suddenly, 1819, he was dismissed in a signal manner. He afterwards lived on his estate of Tegel at the Lake of Spandau. He was the first to draw the attention of philologists to the Basque language of N. Spain, and the Kawi languages of Java and published works on questions connected with Oriental literatures; on the Tahitian language, etc.

Humboldt, river of Nevada; rises in the NE. part of the state; flows WSW. to Humboldt Sink, a large lake with no outlet; length, nearly 350 m.; unnavigable, and strongly impregnated with alkaline matter; banks destitute of trees or shrubs; valley barren.

Hume, David, 1711–76; Scottish historian; b. Edinburgh; was intended for the bar, but was drawn away from his legal studies by love for literature. At sixteen he was a skeptic in matters of religion. In 1734 he went to France, and lived for three years with great economy while composing his "Treatise of Human Nature," which he printed in London, 1738, and subsequently recast under the title of "Inquiry concerning the Human Understanding." In 1742 he published anonymously at Edinburgh the first volume of his "Essays." In 1746 he accompanied Gen. St. Clair as his private secretary in an expedition against the coast of France, and afterwards was also his secretary when he went as minister to Turin. He returned from Italy, 1749, and wrote his "Inquiry concerning the Principles of Morals" and "Political Discourses," 1752. In 1752 he began to write his "History of England." The first volume of the "History of the House of Stuart," containing the reigns of James I and Charles I, 1754, was unfavorably received. The second volume, embracing the reigns of Charles II and James II, 1756, met with better success. In 1757 appeared his "Natural History of Religion." His "History of the House of Tudor," 1759, was severely criticized. In 1761 he published two volumes containing the earlier portion of the English annals. In 1763 he accompanied the Marquis of Hertford to Paris, where the marquis was appointed minister. On the departure of Lord Hertford Hume became *chargé d'affaires*, and 1766 returned to England. In 1767 he was invited by Gen. Conway to become Under Secretary of State. He remained in London until Conway was superseded, and, 1769, returned to Edinburgh. In April, 1776, he finished his "Own Life," and provided for the publication of his "Dialogues on Natural Religion," a work written in early life. In a later edition of the "Inquiry" he prefixed a disclaimer of the "Treatise," and expressed the desire that the "Inquiry" may alone be regarded as containing his philosophical sentiments and principles.

Hume, Joseph, 1777–1855; British political reformer; b. Montrose, Scotland; became a surgeon in the service of the E. India Company, and after holding several lucrative appointments in India, returned to England, 1808; was elected to Parliament in the Tory interest, 1812, but was soon compelled to resign on account of his reforming propensities. Returned, 1818, he began his career as a radical reformer in every department of Church and State; attacked the laws unfavorable to the working classes, caused the repeal of the law prohibiting the exportation of machinery, and protested against the practice of flogging in the navy, the impressment of seamen, imprisonment for debt, and public abuses of every kind.

Hu'merus, large cylindrical bone of the upper arm from the shoulder to the elbow, forming at its upper extremity a hemispherical head, which is connected with the scapula, and two tuberosities for the attachment of muscles. The whole combination of the head of the humerus, the scapula, and clavicle is also called humerus.

Humid'ity, in meteorology, the amount of moisture or vapor of water in the air. In atmospheric phenomena the vapor of water passes into the air by evaporation. It is constantly passing off from the surface of water or of moist bodies, even from ice. A given space at a given temperature can contain only a definite amount of water. If it contains less it will endeavor to fill up by evaporation; if it contains more the surplus moisture will condense. When a mass of air contains all the moisture it is capable of holding it is said to be *saturated*. The higher the temperature the more moisture it takes to saturate the air. If it contains less moisture than would saturate it at the given temperature, then the lower temperature at which this would be sufficient for saturation is called the dew-point. If the temperature of such air falls, it will sooner or later reach the dew-point and condensation will begin.

The percentage of the moisture in the air to what it could hold if saturated is called the *relative humidity*; it is measured by the hydrometer. Thus if the air contains a half of the moisture necessary to saturate it, the relative humidity is 50; if only a third, it is 33.

The vapor of water, like any other vapor or gas, exerts a pressure in its endeavor to expand. The pressure or *tension of the vapor*, expressed in inches or millimeters of the mercurial column of the barometer, is one way of expressing the *absolute humidity*, or the absolute amount of vapor in the air. Absolute humidity can also be expressed in terms of the number of grains weight of vapor in each cubic foot of air. Vapor, in the atmosphere, by reflecting back to earth the heat radiated into the air, equalizes the temperature, and serves as a blanket to prevent the escape of heat. The enervating effect of a moist, hot atmosphere is well known, and is in part due to the fact that such a condition of the air makes relief by perspiration impossible. See DEW.

Humil'iate Nuns, order of Benedictine nuns, called also NUNS OF BLASSONI, from the name of their foundress. They served as nurses. In 1571 they were suppressed by Pius V for some disorders, but a few convents, greatly decayed, still exist in Italy.

Humiliates, order of canons and lay brothers following the rule of St. Benedict. They were originally lay brothers of a congregation founded abt. 1134. In 1151 they were reformed by St. John of Meda, and became in part canons regular of St. Benedict.

Hummel (hŏm'ĕl), **Johann Nepomuk**, 1778–1837; German composer; b. Presburg, Hungary; taught at Vienna, 1811–16, and was afterwards chapel master successively to the King of Würtemberg and the Grand Duke of Saxe-Weimar; excelled as a pianist, improvisator, and composer; made many tours through Germany, France, Great Britain, and Russia; compositions consist of operas, pantomimes, ballets, masses, concerted pieces for various instruments, trios, quartets, quintets, and septets, with many works for the piano; wrote a complete pianoforte method.

Hum'ming Bird, common name of a large family (*Trochilidæ*) of beautiful, slender-billed birds, found in America and its adjacent islands. The most brilliant species live in the tropical forests, amid the rich drapery of the orchids, whose magnificent blossoms rival the beauty of the birds themselves. In whatever latitude, their manners are the same; very quick and active, almost constantly on the wing, as they dart in the bright sun they display their brilliant colors. When hovering over a flower in which they are feeding, their wings are moved so rapidly that they become invisible, causing a humming sound, whence their common name, their bodies seeming suspended motionless in the air. They rarely alight on the ground, but perch readily on branches; they are very pugnacious, and will attack any intruder coming near their nests. The ruff-necked humming bird of the W. parts of N. America is about 3¼ in. long, with a wedge-shaped tail; in the male the upper parts, lower tail coverts, and tail are cinnamon colored, the latter edged or streaked with purplish brown; throat coppery red, with a ruff, and below it a white collar. The Anna humming bird is somewhat larger, also inhabiting California and Mexico. The mango humming bird may be distinguished by the absence of metallic, scalelike feathers on the throat, and by the serrations of the end of the bill; the prevailing colors are metallic green and golden above, and velvety bluish black below, with a tuft of downy white feathers under the wings. The

RUBY-THROATED HUMMING BIRD.

common species throughout the E. states, extending to the high central plains, and S. to Brazil, is the ruby-throated humming bird. The length of this "glittering fragment of the rainbow" (as Audubon calls it) is about 3½ in.; extent of wings, 4¼ in.; the upper parts are uniform metallic green, with a ruby-red gorget in the male, a white collar on the throat, and the forked tail brownish violet.

Humperdinck (hŏm'pĕr-dĭngk), **Engelbert**, 1845– ; German musician; b. Siegberg; studied at the music school in Cologne, the Mozart Institution, Frankfort, and the Royal Music School, Munich; received the first prize of the Felix Mendelssohn-Bartholdy Institute in Berlin, and the Meyerbeer prize of the Royal Academy of Arts in Berlin; professor in the Barcelona Conservatory, 1885–86; previously, 1881–82, had resided at Baireuth and aided Wagner in preparing "Parsifal" for the stage; taught at Cologne, 1886–87; was called to the Hoch Conservatory, Frankfort, 1890; resigned, 1896. His compositions are many, in various forms; his greatest success was made in his fairy opera "Hänsel and Gretel."

Humphrey (hŭm'frĭ), **Sir George Murray**, 1820–96; English anatomist; b. Sudbury, became Prof. of Anatomy in Cambridge, 1866, and of Surgery there, 1883; knighted, 1891; author of "Treatise on the Human Skeleton, including the Joints," "The Human Hand and the Human Foot," "The Coagulation of the Blood in the Nervous System during Life," "The Limbs of Vertebrate Animals," "Observations in Myology," "Old Age and the Changes Incidental to It," "Vivisection: What Good Has It Done?"; coeditor of *Journal of Anatomy and Physiology* after 1867.

Hum'phreys, **Andrew Atkinson**, 1810–83; U. S. topographical engineer; b. Philadelphia,

Pa.; son of Samuel Humphreys, chief contractor of the U. S. navy, 1816–46; graduated at West Point, 1831; entered the service of the Government as civil engineer, 1837, had charge of the Coast Survey office at Washington, 1844–49; 1850 and 1857 was engaged in the topographic and hydrographic survey of the delta of the Mississippi; 1854–61 was largely engaged in determining the best route for a railway from the Mississippi to the Pacific Ocean; served in the Civil War on McClellan's staff, and was chief topographical engineer throughout the campaign on the Virginia Peninsula; became brigadier general of volunteers, 1862; distinguished himself at Gettysburg and Fredericksburg; appointed chief of staff to the commanding general of the Army of the Potomac; breveted major general, U. S. army, 1865; chief of engineers, U. S. army, with rank of brigadier general, 1866; retired, 1879.

Humphreys, David, 1752–1818; American poet; b. Derby, Conn.; entered the army as captain at the beginning of the Revolutionary War; appointed aid-de-camp to Washington, 1780; accompanied Jefferson to France, 1780, as secretary of legation; went, 1794, to Lisbon, and, 1797, to Madrid, as ambassador, and returned to U. S., 1802; was one of the first to introduce merino sheep to the U. S., and established a large woolen and cotton factory in Derby. During the War of 1812 he commanded the militia of Connecticut; while residing at Hartford, 1786–88, he published with Hopkins, Barlow, and Trumbull, the "Anarchiad." The most prominent of his other poems are "An Address to the Armies of the United States," "The Future Glory of the United States," "The Love of Country," and "The Death of Washington."

Hu'mus, a class of substances but little understood, formed by the natural decomposition of plant tissues. Mixed with the decomposition products of the rocks they form the fertile soils of the earth's surface. They are particularly abundant in peat, manures, and rotten wood. Special names have been given to some of the substances, as ulmin, ulmic acid, humic acid, crenic and apocrenic acid.

Hun'dred, division of many English counties, stated to have been first made by King Alfred. Some of the counties have no hundreds, but have wapentakes, wards, or other similar divisions. The counties of Delaware are divided into hundreds.

Hundred Days, The, period between Napoleon's return from Elba on March 1, 1815, and his second abdication on June 22d of the same year. Louis XVIII had found but slight popular support for the restored Bourbon monarchy, and when Napoleon advanced toward the capital with rapidly increasing forces, the king was forced to flee across the border. On March 20th the invader was again installed in the Tuileries, and began his rule with promises of liberal government in France and assurances of peaceful intentions toward foreign powers, but the Allies at once prepared to take the offensive, each agreeing to furnish 180,000 men to serve against him. Then followed the campaign that ended with the battle of Waterloo on June 18th, and four days later Napoleon formally abdicated,

Hundred Years' War, contest between England and France that lasted from 1337 to 1451, though that period was interrupted by several intervals of peace. It arose out of the Scottish war, in which France had aided the Scots against England, in the hope of wresting from the latter country the duchy of Guienne. The period of the war closing with the peace of Bretigny, 1360, was marked by the English victories of Crécy and Poitiers and the capture of Calais. Charles V renewed the war, 1369, and won back much that had been lost, but in the reign of Henry V of England there followed a second period of English success, signalized by the brilliant victory of Agincourt, 1415. By the Treaty of Troyes, 1420, Henry received in marriage the daughter of the French king, Charles VI, and was nominated as the latter's successor; but Henry died in the same year as Charles, and the war was renewed when the weak and incapable Henry VI was on the English throne. Inspired by Joan of Arc and led by the skillful general Dunois, the French rapidly regained the upper hand. By 1451 the English were driven from the provinces, and four years later Calais was all that remained of the English possessions in France.

Hun'eric, second King of the Vandalic Empire in Africa; reigned 477–84 A.D. He was a son of Genseric, and married to a daughter of the Emperor Valentinian. He was cruel and cowardly, and became most noted for the persecutions which he raised against the orthodox Christians.

Hunfalvy (hŏn'fŏl-vē), **Pál,** 1810–88; Hungarian philologist and ethnologist; b. Nagy-Szalok; was appointed Prof. in Jurisprudence, 1842, at the Academy of Käsmark; sat in the Hungarian Diet, 1848–49, and subsequently lived in Pest. By his philological and ethnological researches he defined the position of the Hungarian language in the Uro-Altaic family, and explained its relations to the Finnish and Turkish. In 1856 he founded *Hungarian Philology,* a periodical for the Hungarian language, in Pest. He published "The Language of the Konda-Woguls," "The Language of the Northern Ostiaks," "Hungarian Ethnography," "The Roumanian Language," and other works.

Hun'gary, E. part of the territory forming the monarchy of Austria-Hungary; sometimes called Transleithania, "the country beyond the Leitha"; bounded N. by Galicia and a small portion of Austrian Silesia; E. by Bukowina and Roumania; S. by Roumania, Servia, Bosnia, and Dalmatia; SW. by the Adriatic; W. by Carniola, Styria, and Lower Austria; NW. by Moravia. As the form of the government and its geographical and statistical features are described in the article on AUSTRIA-HUNGARY, it remains to note only the history of the country.

Hungary is inhabited by a number of races speaking several distinct languages, but the Magyars are the predominant people. The

country was a Roman possession, forming parts of the two provinces of Pannonia and Dacia. After the fall of the Roman Empire it was overrun by different nations, among which the Huns and the Avars sustained themselves on the soil for the longest period. At the close of the ninth century it was divided into many small kingdoms, and Wallachs, Bulgarians, and Germans formed a large portion of the population. In 887 the Magyars, a Turanian people, descended under Arpád into the plain of the Danube, and after ten years' fighting conquered the country and ruled from the summits of the Carpathian Mountains to the foot of the Styrian Alps. Their history falls into three periods—under the dynasty of the Arpáds to 1301, under the elective monarchy from 1301 to 1526, and under the dynasty of the house of Hapsburg from 1526 to our time.

The most remarkable of the Arpád dynasty, Stephen I, 997-1038, was crowned by Pope Sylvester II, 1000, as King of Hungary, and received the title of "His Apostolic Majesty" (which since that time has been the title of the Hungarian kings), as a reward for his exertions in behalf of the Church. He added Transylvania to his dominions, and under him Christianity was introduced. At the battle of Mohacs, 1526, the Hungarian army was destroyed by a Turkish army under Solyman the Magnificent, and the king, Louis II, was drowned in flight. The latter's wife, the sister of Ferdinand of Austria, hastened to carry the crown to her brother, who inaugurated the still reigning dynasty of the Hapsburgs. Up to the days of Francis Joseph I it was the policy of Austria to try to dissolve the Hungarian constitution and recast the nation in German molds. Her intrigues brought about the revolution of 1848-49 in which the house of Hapsburg was declared deposed by the National Assembly, and Kossuth was chosen governor general. A deadly and heroic struggle was carried on, and probably would have been successful but for the intervention of Russia. Austrian order was once more restored, but the demand for a new constitution, which had been sanctioned by the Austrian Emperor, 1848, continued. At last, after the battle of Sadowa (July 3, 1866), and the entire separation of Austria from Germany, the Austrian Govt. felt compelled to submit. In February, 1867, an independent Hungarian ministry was formed under the leadership of Count Andrássy, and in December of the same year the final emancipation of the Hungarian crown on the basis of the constitution of 1848 was accomplished. The chief events in the latter part of the nineteenth century and the beginning of the twentieth were the formal recognition by Austria of Hungary's economic independence, and the insistent demand for the use of Hungarian as the language of command in the Hungarian portion of the common army.

Hun'ger. See FAST; FOOD.

Huns, extremely savage and ugly tribe of warlike nomads with dark complexions, small, deep set black eyes, broad shoulders, and flat noses. They came from the vast barren plateaus of E. Asia, N. of China, and while one part of them, after long migrations toward the W., settled along the shores of the Caspian Sea, and later became known as the White Huns, the other part crossed the Volga and conquered the Alani, who became incorporated with them. In 376 they crossed the Dnieper, defeated the Goths, and drove them over the Danube into the Roman province of Pannonia. In 432, under Attila, they crossed the Danube, and the Roman Emperor, Theodosius II, had no other means of stopping them than by paying them an annual tribute. When, after the death of Theodosius, the tribute ceased to be paid, Attila pushed forward and visited Gaul, where he was defeated by the Roman general Ætius and the Gothic allies at the great battle of Châlons, 451. With the fragments of his army he advanced into Italy, where Pope Leo I, by means of a personal interview, persuaded him to retreat. After the death of Attila, abt. 454, the Huns dissolved and disappeared among the other barbarian tribes.

Hunt, Helen. See JACKSON, HELEN MARIA (HUNT).

Hunt, Henry, 1773-1835; English politician; b. Wiltshire; was a wealthy farmer, and in early life was noted for extreme loyalty. Having been imprisoned for challenging his militia commander, he became a champion of the most radical section of the Reform party, and the political associate of Sir Francis Burdett, Horne Tooke, and William Cobbett. In August, 1819, he presided over the Reform meeting in Manchester, which led to his indictment and imprisonment for conspiracy. In 1830 and 1831 he was elected to the House of Commons; but failing of an election to the next Parliament, made the tour of England in a handsome equipage, speaking in the principal towns, and offering for sale, under the name of "Radical coffee," roasted grains of wheat, as a substitute for the heavily taxed coffee of the W. and E. Indies.

Hunt, Henry Jackson, 1819-89; U. S. army officer; b. Detroit, Mich.; graduated at West Point, 1839, and entered the army in the artillery; served on frontier and garrison duty and in the Mexican War, 1846-48. During the Civil War he served in the defense of Fort Pickens, in the Manassas campaign, and as aid-de-camp to McClellan, and commanded the artillery reserves of the Army of the Potomac in the Peninsular campaign of 1862, and commanded in chief the artillery of that army from September 18, 1862, to the close of the war; appointed brigadier general of volunteers, 1862; brevet major general of volunteers and brevet colonel, brigadier general, and major general U. S. army for gallant services at Gettysburg, Petersburg, and in the field. He was member of various boards for the armament of fortifications; president of the Permanent Artillery Board for the army; and contributed more than any other officer to the organization and effective use of his arm of the service during the Civil War; retired, 1883; governor of the Soldiers' Home, Washington, from 1885 until his death.

Hunt, James Henry Leigh, 1784–1859; English poet and essayist; b. Southgate; read law for a time and was employed in the War Office till 1808. His "Juvenilia," poems, was published 1801; 1805 he became a critic for *The News*, and, 1808, established, with his brother John, *The Examiner*, a journal which became a power in the political world by reason of the independent course of its editors. The brothers were imprisoned (1812–15) for using language which was regarded as lacking in respect for the prince regent, but the kindness of Moore, Byron, and the Whig literati made Hunt's jail life a very pleasant episode in his career. His best poem, "The Story of Rimini," 1816, was among the books written during his imprisonment; many volumes of poems, essays, translations, and romance followed; among the best are "Men, Women, and Books," and "Autobiography."

Hunt, Richard Morris, 1828–95; American architect; b. Brattleboro, Vt.; was a pupil at the École des Beaux-Arts in Paris, and in the office of H. M. Lefuel, who became director of the works of the new Louvre, 1854. Hunt was employed on the building between the Louvre and the Tuileries, and especially on the Pavillon de la Bibliothèque, opposite the Palais Royal. He returned to the U. S., 1855; devoted himself actively to his profession, and did good service in elevating the taste for architecture at home. He built villas in Newport, residences in Boston and New York, the Lenox Library, the Divinity College building at Yale, and *The Tribune* building in New York, the Naval Observatory at Washington, and the Administration Building at the Columbian Exposition at Chicago, 1893.

Hunt, Thomas Sterry, 1826–92; American chemist and geologist; b. Norwich, Conn.; became assistant in chemistry to Prof. Silliman, 1845; chemist and mineralogist for the Geological Survey of Canada, 1847–72; was one of the English jurors at the Paris Exposition, 1855, when he received the cross of the Legion of Honor; was one of the organizers of Laval Univ., Quebec; was for four years a lecturer in McGill Univ., Montreal, and was Prof. of Geology in the Massachusetts Institute of Technology, 1872–78; was one of the founders and first president of the Royal Society of Canada, and was one of the organizers of the International Geological Congress. He wrote many papers on mineralogy, chemistry, dynamic geology, and kindred topics.

Hunt, William, called also WILLIAM HENRY, 1790–1864; English water-color painter; b. London; was connected with the first Water-color Society, of which he was elected associate, 1824, and full member, 1827. His work was remarkable for minute execution and delicate finish. Flowers, fruit, and birds' nests are his common subjects, as well as dead birds painted for the beauty of their plumage; but he also made many drawings of peasant boys in smock frocks and peasant children. In the South Kensington Museum are his "Hawthorn Blossoms and Birds' Nests," "Grapes, Melons, and Plums," "The Doubtful Coin," "A Brown Study," and other works.

Hunt, William Holman, 1827– ; English figure painter; b. London; became known as one of the chiefs of the pre-Raphaelite group in British art; spent much time in the East, particularly in Jerusalem, where he made studies of Oriental types of character. In 1849 Hunt exhibited "Rienzi Vowing to Avenge the Death of his Brother," the first of his works executed in the pre-Raphaelite manner. "The Light of the World" is one of his best-known works. Other important works are "The Saviour in the Temple," "The Shadow of Death," and "The Triumph of the Innocents."

Hunt, William Morris, 1824–79; American portrait, landscape, and figure painter; b. Brattleboro, Vt.; studied under Couture in Paris, and then went to Barbizon, where he worked with Millet, and was strongly influenced by his example and advice. He returned to the U. S., 1855, and settled at Newport, R. I., but later went to Boston, where he became a successful teacher. His influence on art in the U. S. was considerable, and in a good direction. Some of his works are in the Boston Museum of Fine Arts, and in the capitol at Albany, N. Y., he executed two mural paintings, "The Flight of Night" and "The Discoverer."

Hun'ter, David, 1802–86; U. S. army officer; b. Washington, D. C.; graduated at West Point, 1822; captain of dragoons, 1833; resigned in 1836; reëntered the service as paymaster, with the rank of major, 1842, on which duty he served until 1861, when (May 14th) he was appointed colonel of the Sixth U. S. Cavalry, and three days later brigadier general of volunteers, as such commanding division at Bull Run (July 21st), where he was wounded; promoted major general of volunteers, August, 1861. In May, 1862, while in command of the Department of the South, he issued an order declaring slavery abolished in that department, but this was annulled by Pres. Lincoln in a proclamation. In May, 1864, Hunter succeeded Gen. Franz Sigel in command of the Department of W. Virginia; the battle of Piedmont and subsequent march against Lynchburg via Lexington occurred the following month; a strong Confederate force arrived in time to relieve that city, however, and, Hunter's ammunition giving out, he made a hasty retreat, closely pursued by the enemy. In 1865 he was a member of the military commission which tried the conspirators engaged in the assassination of Lincoln; retired 1866.

Hunter, John, 1728–93; British physiologist and surgeon; b. Glasgow, Scotland; brother of the celebrated William Hunter; went, 1748, to study anatomy with his brother; became a surgical pupil at St. Bartholomew's, 1751, and at St. George's, 1754; studied surgery under Cheselden and Pott; lectured on anatomy, 1754–59; attained great knowledge of human and comparative anatomy; served in France and Portugal as staff surgeon, 1761–63; began to practice surgery in London, 1763; was made F.R.S., 1797, in consequence of the publication of papers containing new discoveries in pathology and physiology; became surgeon to St. George's Hospital, 1768; surgeon extraordinary

to the king, 1776; surgeon general of the forces and inspector general of hospitals, 1790. He was the boldest and best operator of his time, an anatomist of marvelous knowledge, and one of the fathers of zoölogical science. He was the collector of the great Hunterian Museum, purchased by the British Govt. and presented to the Royal College of Surgeons.

Hunter, Robert Mercer Taliaferro, 1809–87; American statesman; b. Essex Co., Va.; admitted to the bar, 1830; entered political life as member of the legislature, 1833; member of Congress, 1837–43 and 1845–47; Speaker of the House, 1839; U. S. Senator from 1847 till July, 1861, when he was expelled for disloyalty; prominent candidate for the Democratic presidential nomination, 1860; took a leading part in the secession movement; succeeded Robert Toombs as Confederate Secretary of State; was soon succeeded by Judah P. Benjamin; elected to Confederate Senate, where he opposed the administration of Pres. Davis; was one of the three peace commissioners to meet Pres. Lincoln in Hampton Roads, 1865; after the war was arrested, paroled, and, 1867, pardoned by Pres. Johnson.

Hunter, William, 1718–83; British anatomist and obstetrician; elder brother of John Hunter; b. Glasgow, Scotland; studied medicine in Edinburgh and London, whither he went, 1741; began to lecture on surgery and anatomy, 1746; acquired a wide fame as a surgeon and accoucheur, devoting himself after 1749 chiefly to the practice of obstetrics; became physician to the queen, 1764; F. R. S., 1767; Prof. of Anatomy, 1770; president of the College of Physicians, 1781; associate of the Academy of Sciences, Paris, 1782. His splendid collection of anatomical and pathological specimens, coins, books, etc., is now the Hunterian Museum of the Univ. of Glasgow.

Hun'tingdon, Selina (Countess of), 1707–91; English religious leader; daughter of Washington Shirley, Earl Ferrers; was married to Theophilus Hastings, Earl of Huntingdon, a man of great religious zeal (d. 1746); became a very zealous Christian; made Whitefield her private chaplain, and became the leader of Calvanistic Methodism in England, her followers being known as the "Countess of Huntingdon's Connection." Her large means were devoted to the dissemination of her religious views, and to this end she built and maintained a college at Trevecca, Wales, for the education of Calvinistic ministers; also built chapels throughout England, and provided for their support. It is said that in all she erected sixty-four chapels, the finest of which is at Bath, for the management of which she bequeathed the bulk of her fortune in trust.

Huntington, Daniel, 1816–1906; American portrait and genre painter; b. New York; pupil of Samuel B. F. Morse and Inman; went to Europe, 1839 and 1844; painted some important pictures in Rome and Florence; became a National Academician, 1840; president, 1852–69, and painted the portraits of many well-known people in the U. S., including Presidents Lincoln (Union League Club, New York) and Van Buren (State Library, Albany, N. Y.); also those of Sir Charles Eastlake and the Earl of Carlisle in England. His "Mercy's Dream" is in the Corcoran Gallery, Washington.

Huntington, Samuel, 1731–96; signer of the Declaration of Independence; b. Windham, Conn.; learned the trade of a cooper; became, 1758, a lawyer of Norwich, Conn.; member of the Continental Congress, 1776–83, and its president, 1779–81; judge of the Connecticut Superior Court, 1774–84; its chief justice, 1784; Lieutenant Governor of Connecticut, 1785; governor, 1786–96.

Huntington, capital of Cabell Co., W. Va.; on the Ohio River; 52 m. W. of Charleston, the state capital; is the seat of Marshall College (State Normal School); has railway machine and car shops, saw and planing mills, and a variety of manufactures, and is the shipping point of the coal, iron, and lumber products of a large region. Pop. (1906) 13,015.

Hunyady (hôn'yŏd-ē), **János,** d. 1456; Hungarian general and statesman; date and place of birth unknown. Under Vladislas I (1439–44) he was Count of Temes and commander of Belgrade. He repulsed a Turkish army of invasion from his province, and soon after routed the same in Transylvania, 1442. In 1443 he made a victorious compaign through Servia and across the Balkan, which conquered peace from the Turks. Having escaped from the slaughter of Varna, 1444, he was made Governor of Hungary during the minority of Ladislas the Posthumous. In 1448 Hunyady was defeated by Sultan Amurath at Kosovo, but, 1454, he was again victorious over the Turks. His last act was a heroic defense of Belgrade. King Matthias Corvinus was his son.

Hurd'war. See HARDWAR.

Hur'dy-gur'dy, musical instrument of the stringed kind, at one time much used by the European peasantry, but now seldom seen except in the hands of Savoyard boys, who play it in the streets. It consists of a flat sounding board, connected by tolerably deep ribs to a back of the same size and shape. It has four strings of gut, which are put into vibration by the edge of a wooden wheel turned by a handle. It is suited only to very simple melodies.

Hu'ron, Lake, one of the Great Lakes on the boundary between the U. S. and British America; receives at its N. extremity the waters of Lake Superior by St. Mary's River or Strait, and also those of Lake Michigan through the Strait of Mackinaw. Its outlet at the S. extremity is the St. Clair River. It is bounded W. and SW. by the S. peninsula of Michigan, and N. and E. by Ontario, Canada. Georgian Bay, 120 m. long and 50 m. wide, lies wholly within Ontario. The whole width of Lake Huron, including Georgian Bay, is about 190 m.; length about 250 m.; area, 23,200 sq. m. Its elevation above the sea is about 580 ft. Its average depth is estimated at from 200 to 700 ft. The largest indentation on the W. is Saginaw Bay, which extends into the land 60 m. toward the SW. The chief islands

are the Manitoulin group. The lake abounds in whitefish. The rivers that flow into it are mostly of small importance. The chief towns on its shores are Collingwood, Owen Sound, Goderich, and Sarnia, in Ontario; in Michigan, Bay City and Port Huron.

Huro'nian Se'ries, in geology, a division of the pre-Cambrian rocks. The rocks first described under this name occur on the N. shore of Lake Huron, and consist of unaltered and little altered sandstones, conglomerates, shales, and limestones, with interbedded igneous rocks. Metamorphic rocks of other districts were afterwards correlated with the Huronian of Lake Huron, and the term has been widely used to indicate dark-colored rocks in all parts of the earth.

Hu'rons, members of a once powerful tribe of American Indians, originally occupying a small territory near Georgian Bay, Lake Huron. They were the extreme NW. branch of the Huron-Iroquois family. When the French under Champlain began to occupy the St. Lawrence, 1609, the Hurons were allies of the Algonquins and Montagnais against the Iroquois or Five Nations, the most powerful tribe of the family to which the Hurons belonged. Champlain joined the alliance, and accompanied them on expeditions, 1609 and 1615. Abt. 1630 there were about 30,000 Hurons in 25 towns, in a region about 75 by 25 m., near Lake Huron. When Canada was restored, 1632, the Jesuits began their famous Huron missions, which lasted till the destruction of the nation. In 1648 the Iroquois took Ossossane, their chief town, and, 1649, two other large towns were destroyed. The Hurons then dispersed. In 1905 there were 455 in Canada and 378 in the U. S.

Hur'ricanes, tropical cyclones of great intensity which pass over the W. Indies. They originate to the E. of the W. Indies on the Atlantic Ocean, travel at first W. until they strike the islands. From here they usually turn first N., then NE., skirting the Atlantic coast of the S. states. By the time they have reached the mid-Atlantic on this arm of their path they have so far lost their intensity that they differ little from other storms. A few, instead of striking to the NE., continue W. in tropical latitudes, striking the continent anywhere from Honduras to Texas. Their violence is apparently greatest near where they originate, and their diameter is smallest at that time. As they advance they expand in size and decrease in violence, though this change is at first slow. They are storms of the same order as the typhoons of the China Sea, and the tropical cyclones of the Mascarene Islands of the Indian Ocean and of the Samoan and Fiji Islands of the S. Pacific. They differ from the cyclones or storm areas of temperate regions in their smaller size, slower motion, and greater intensity, characters all due, probably, to their origin over tropical seas.

The season of hurricanes is from July to October. Out of a total of 355 hurricanes recorded in three hundred years, 42 occurred in July, 96 in August, 80 in September, 69 in October. These winds, as in all cyclones, turn, in the N. hemisphere, in a direction opposite to those of the hands of a clock. The rate of speed averages 300 m. daily among the islands. The usual signs of their approach are an ugly and threatening appearance of weather, sharp and frequent puffs of wind which increase in force, a long heavy swell coming from the direction of the storm. The barometer, however, is the best guide, and, during the hurricane months, a decided fall of the mercury or sharp and irregular oscillations are indications of the approaching storm. The barometer is lowest in the center of a hurricane, and rises steadily in every direction.

Hurter (hôr'tĕr), Friedrich Emanuel von, 1787–1865; Swiss historian; b. Schaffhausen; filled high ecclesiastical offices, but was opposed on account of his high-church views, and his history of Pope Innocent III in 1841 caused his withdrawal from the church over which he presided in Schaffhausen; became a Roman Catholic, 1844, and, 1846, historiographer of the Emperor of Austria, who ennobled him; works include "History of King Theodore and His Reign," "Birth and New Birth," "Emperor Ferdinand II," "Last Four Years of the Life of Wallenstein."

Hur'tleberry. See WHORTLEBERRY.

Hus, John. See HUSS, JOHN.

Hus'band and Wife. See MARRIAGE.

Hus'bandry, Pa'trons of. See PATRONS OF HUSBANDRY.

Hush (hôsh), or Husi (hô'sē), town of Roumania (Moldavia), near the Pruth River; 38 m. SE. from Jassy; has a Greek bishop, a normal school, and is a place of commercial importance. A fine wine is produced in the vicinity. The treaty of 1711 between Turkey and Russia was signed here. Pop. (1899) 15,484.

Hus'kisson, William, 1770–1830; English statesman; b. Worcestershire; was Under Secretary for War and the Colonies, 1795–1801; Secretary of the Treasury, 1802–6 and 1807–9; appointed Chief Commissioner of Woods and Forests, 1814; member of the cabinet as president of the Board of Trade and Treasurer of the Navy, 1823–27; in the Goderich cabinet and in that of the Duke of Wellington he was Secretary for the Colonies till May, 1829; member of Parliament from 1796 till his death, excepting 1802–4. As a public man he was chiefly known by his speeches on financial and commercial subjects, and he is regarded as the great pioneer in the free-trade movement.

Huss, John, abt. 1369–1415; Bohemian rèligious reformer; b. Husinec; began to lecture on philosophy and theology in the Univ. of Prague, 1398; became president of the university faculty of theology, 1401; and was installed preacher in the Bethlehem chapel, 1402, and rector of the university, 1409. In successive sermons he arraigned the misconduct of the clergy even in high places; demanded the despoiling of the churches of useless ornaments, that the poor might be fed and clothed;

and called on the secular officers to hinder and punish the open vices of ecclesiastics. The cry of heresy was soon raised against him, and he was summoned to Rome to answer this charge. He sent advocates to plead his cause before the cardinals, but they were not heard; he was condemned as a heretic, and ordered to quit Prague. His retirement only inflamed the zeal of his partisans. An outbreak in the city followed; the partisans of Huss were victorious, the archbishop fled, and Huss went back to his chapel. He issued tracts maintaining that not the priest's word, but the power of God, wrought the change of transubstantiation; that anyone moved by the Spirit had the right to preach; and asserting the right of conscience as against the edicts of popes and councils. He was again put under ban as an incorrigible heretic.

In 1414, at the instigation of the Emperor Sigismund, Pope John XXIII summoned a General Council at Constance, and Huss was cited to appear. Notwithstanding the emperor's safe conduct, he was not long after his arrival arrested and imprisoned (November 28th). On June 5, 1415, he had his first hearing before the council. At a third hearing (June 8th) thirty-nine articles, extracted from three of his works, were read, touching various points of his teaching concerning the Church, its officers, and sacraments. Huss was then summoned to retract these heresies, which he declined to do, affirming that he could not retract what he had never said, nor ought he to retract what he had said until its falsity was shown. On June 24th his books were condemned to be burned as heretical, and on July 6th he was given over to the secular arm. At the stake he was again summoned to abjure his heresies, but at the summons he only knelt and prayed, using the words of the psalms of David. As the fire was kindled, he began to sing with a loud voice the *Kyrie eleison*, and only ceased when he was suffocated by the rising flame. The writings of Huss, not including the minor pieces, are of four kinds, dogmatic and controversial, exegetical, sermons, and epistles.

Hussars (hŭz-zärz'), national cavalry of Hungary and Croatia, for which every twenty houses were formerly required to furnish one soldier, with a horse and furniture. The name is also applied to some bodies of light cavalry in the armies of other countries of Europe.

Huss'ites, name of the followers of John Huss in Bohemia, who, after his death, 1415, organized as a sect, making the offering of the cup to the laity in the eucharist the badge of their covenant. On the death of Wenceslas, 1419, they refused to recognize the Emperor Sigismund as king, whereupon the Hussite civil war broke out. They were divided into two parties, the more moderate Calixtines and the more rigid Taborites. Under Ziska and Procopius, leaders of the latter, they won numerous successes. In 1433 the Calixtines accepted the concessions of the Council of Basel, and after the defeat of the Taborites near Bohemian Brod, 1434, they were accepted by Bohemia, and Sigismund was recognized as king. After his death, 1437, civil wars were again waged with no decisive results till 1485, when a peace was established by King Ladislas which secured Catholics and Calixtines in the possessions they then held.

Hutch'ins, Thomas, abt. 1730–89; American geographer; b. Monmouth, N. J.; at an early age entered the British military service, and became captain in the Royal American regiment; acted as engineer in Gen. Henry Bouquet's expedition against the Shawnees, 1764, and participated in a campaign against the Florida Indians. Being in London, 1779, his known devotion to the independence of the colonies led to an imprisonment for six weeks on a charge of maintaining correspondence with Franklin. Soon afterwards he sailed from France to Charleston, S. C., and joined the army under Gen. Greene, receiving the title of geographer general. He furnished the maps and plates for Dr. Smith's "Account of Bouquet's Expedition"; published "A Topographical Description of Virginia, Pennsylvania, Maryland, and Carolina, with Maps," "An Historical and Topographical Description of Louisiana and West Florida."

Hutch'inson, Anne, 1591–1643; American religious enthusiast; b. Lincolnshire, England; daughter of the Rev. Francis Marbury; removed to Boston with her husband, 1634; was admitted a member of the Boston Church; and instituted meetings of women to discuss sermons and doctrines, in which she gave prominence to peculiar speculations, which two years afterward led to public strife between her supporters and her opponents. Among her partisans were Vane, Cotton, Wheelwright, and the whole Boston Church with the exception of five members, while the country churches were generally united against her. Her peculiar tenets were among the eighty-two opinions condemned as erroneous by the ecclesiastical synod at Newtown, August 30, 1637; and in November she was tried and sentenced with some of her associates to banishment from Massachusetts. She went to the island of Aquidneck (now Rhode Island), where many of her friends had preceded her; but after the death of her husband, 1642, she removed with her surviving family to near New Amsterdam (New York), where she and all but one of her children were killed by savages.

Hutchinson, John, 1674–1737; English philosopher; b. Spennithorne, Yorkshire; in his "Moses's Principia" he disputed the Newtonian theory of gravitation, and maintained on biblical authority the doctrine of a *plenum* in opposition to that of a *vacuum*; in his "Thoughts Concerning Religion" his leading idea is, that the Scriptures contain the elements of all rational philosophy as well as of religion. His followers were known as Hutchinsonians.

Hutchinson, Thomas, 1711–80; last colonial Governor of Massachusetts; b. Boston; studied law; representative for Boston in the General Court for ten years; was three times speaker;

became lieutenant governor, 1758; chief justice in 1760; acting governor, 1769; and full governor, 1771. He early became obnoxious to the patriots on account of his unwavering support of all the measures of the British ministry. In the Stamp Act riots of 1765 his house was twice attacked; on the second occasion (August 26th) his furniture was burned in the street and an invaluable collection of historical MSS. lost or destroyed. Brought into constant collision with the Assembly and Council during the stormy years preceding the Revolution Hutchinson was the most prominent mark in the colonies for the invectives of Otis, Bowdoin, Hancock, and the two Adamses. Wearied with the conflict, he sailed for England on leave of absence, June 1, 1774, and never returned. Hutchinson was an accomplished scholar, and his writings are valuable sources of information for New England history.

Hutchinson Fam'ily, American popular singers; b. Milford, N. H.; children of a farmer; were named JESSE, JUDSON, JOHN, HENRY, ASA, ABBIE, JOSHUA, and FANNIE; made a public appearance in New York, 1843; subsequently toured the N. states and also visited Great Britain and Ireland; excelled in sacred and descriptive songs, and in humorous and pathetic ballads; aided the antislavery and temperance movements, and in the political canvasses of 1856 and 1860 traveled from the Atlantic to the Pacific, forming several bands from a third generation of the family. JUDSON, the eldest, wrote many popular airs, including "Emancipation Song," "Old Granite State," and "Good Time Coming." ABBY, the contralto, admired for her archness and simplicity, became the wife of Ludlow Patton, of New York. JOHN WALLACE sang for sixty-two years, and was the founder of Hutchinson, Kan., and Hutchinson, Minn.

Hut'ton, Charles, 1737–1823; English mathematician; b. Newcastle-on-Tyne; lived at Newcastle as teacher from 1760 to 1773, during which period he wrote his "Treatise on Arithmetic and Bookkeeping," "Treatise on Mensuration," and "Principles of Bridges and Mathematical Demonstration of the Laws of Arches"; 1773, became Prof. of Mathematics at the Royal Military Academy, Woolwich, and, 1774, a member of the Royal Society; other works "Tables of Products and Powers of Numbers," "Mathematical Tables," and "Recreations in Mathematics and Natural Philosophy."

Hutton, William Rich, 1826–1901; American civil engineer; b. Washington, D. C.; chief engineer of Washington Aqueduct, 1862–63; chief engineer Chesapeake and Ohio Canal, 1869–71; consulting engineer of same to 1880; chief engineer W. Maryland Railroad, 1871–74; designed locks and movable dams for Kanawha River; 1880, removed to New York; consulting engineer of the New Aqueduct of New York City, of the Colorado Midland Railway, and of Harlem River (Washington) Bridge to 1889; chief engineer Hudson River Tunnel; member U. S. Board of Engineers on Obstructions in the Columbia River; member of the Society of Civil Engineers of France.

Hux'ley, Thomas Henry, 1825–95; English biologist; b. Ealing, Middlesex; assistant surgeon of the royal navy, 1846–53; sailed around the world in H. M. S. *Rattlesnake*, which then performed surveying service in Australasia, 1846–50; became F.R.S., 1851, in acknowledgment of the value of the observations in natural science made by him while in the navy; became, 1854, Prof. of Natural History in the School of Mines, and Fullerian Prof. of Physiology; Hunterian Prof. in the Royal College of Surgeons, 1863–69; president of the Geological and the Ethnological Societies, 1869–70; appointed one of the royal commissioners on scientific instruction and the advancement of science, 1870; secretary of the Royal Society, 1872; lord rector of the Univ. of Aberdeen, 1872; president of the Royal Society, 1883; was twice named Fullerian Prof. in the Royal Institution; and was made a privy councilor, 1893. He was for many years one of the most laborious workers in biological science. The comparative anatomy of both vertebrate and invertebrate animals, and the systematic arrangement of organisms, were the fields in which he was chiefly distinguished. He proposed several bold rearrangements of animals into new classes and orders, and discovered some remarkable homologies in the development of vertebrate and invertebrate animals. His theory of protoplasm, his able advocacy of the views of Darwin, and the doctrine boldly advanced by him in his address before the physiological section of the British Association at its Belfast meeting, 1874, that the seemingly voluntary movements of animals, and even of men, are automatic and independent of the will, attracted much attention. He showed great skill in bringing the conclusions of science into simple language to be understood by unscientific people, and the freedom of scientific thought has had no stouter champion.

Huyghens (hoi'hênz), **Christian,** 1629–95; Dutch natural philosopher; b. The Hague; studied law and mathematics; made several journeys to Denmark, France, and England, and resided, 1665–81, at the invitation of Colbert, at Paris, where he was made a member of the Academy of Science and had apartments assigned him in the royal library. The latter part of his life he spent at The Hague. His field of investigations comprised geometry, astronomy, and optics, in all of which he won enduring fame. He was more than any other one person the founder of the undulatory theory of light, which he developed, 1678. It was not generally adopted, by reason, probably, of the great authority of Newton, who adopted the emission hypothesis. By the later labors of Young, Fresnel, and others, the doctrine of Huyghens was restated, and is now universally received. It was, however, more especially his astronomical discoveries which made his name celebrated. At different times in his life he was much occupied in making improvements in the construction of telescopes; 1656, discovered

the first satellite of Saturn, and, 1659, the ring; is also celebrated as the inventor of the pendulum clock.

Huysum (hoi'sūm), **John van**, 1682–1749; Dutch flower and fruit painter; b. Amsterdam; work is distinguished by being extremely minute and true to nature. He obtained great brilliancy of color by some particular method, the secret of which he jealously kept even from his own family. He was patronized by all the great collectors of the time in France and Germany. He painted, besides flower pictures, landscapes with figures and studies in black and white and water color.

Hvit'feld, Arild, 1546–1609; Danish historian; filled many important state offices, finally becoming chancellor, 1595. Between 1595 and 1604 he compiled the "Lives" of the Danish kings, beginning with that of Christian III and working back to the earliest times. The "Chronicle of the Kingdom of Denmark" is of inestimable value to the student of Danish history, as it reproduces many documents that have since been lost.

Hwang'-Hai. See YELLOW SEA.

Hwang'-Ho. See YELLOW RIVER.

Hy'acinth, genus of bulbous-rooted flowering plants of the lily family. Several species are natives of the Old World. Besides these, some species of *Muscari* (globe hyacinths) and *Scilla*, or squill, are called hyacinths by florists. The true hyacinths of cultivation are varieties of *Hyacinthus orientalis*. There are a great many kinds produced from seed, but for ordinary culture the bulbs are planted. These bulbs come chiefly from Haarlem in the Netherlands. They do best in a rich but sandy soil. They are often planted in pots, and for house culture they do tolerably well in hyacinth glasses with water only. According to tradition, the petals of the hyacinth are inscribed with the Greek letters αι, αι, Apollo's exclamation of grief when he found that he had slain the beautiful Hyacinthus; or ια, the first two letters of his name. Hence Milton calls it "that sanguine flower inscribed with woe." The wild hyacinth is the bluebell of England.

HYACINTH.

Hyacinthe (ē-ä-sänt'), **Père.** See LOYSON, CHARLES.

Hyacinthus (hī-ä-sin'thūs), in Greek mythology, a boy of great beauty and the favorite of Apollo; was also beloved by Zephyrus, who from jealousy caused his death by blowing the quoit of Apollo against his head. From his blood sprang the flower hyacinth.

Hyades (hī'ä-dēz), in Greek mythology, nymphs variously described as being from two to seven in number, and bearing eighteen names. According to some authorities, Jupiter placed them among the stars.

Hy'alite, form of opal or hydrated silica, transparent and colorless, with glassy luster. It occurs as an incrustation in igneous rocks, generally in the form of pellucid drops, but has no commercial value. See OPAL.

Hyapurá (hä-pō-rä'). See YAPURA.

Hy'att, Alpheus, 1838–1902; American naturalist; b. Washington, D. C.; became curator of the Essex Institute and Peabody Academy of Science, Salem, Mass., and of the Boston Society of Natural History; fellow of the National Academy of Sciences and of the American Academy of Arts and Sciences; most important works, "Fresh-water Polyzoa" and "Revision of the North American Poriferæ," the latter the first monograph on American sponges.

Hy'brid, animal or plant produced by the sexual union of individuals belonging to two different species. As a rule, in nature sexual union takes place only between individuals of the same species, and the offspring accordingly presents the specific characters common to both its parents. The union between a male and a female of different species, when fertile, produces an offspring which does not precisely resemble either of its parents, but presents a mixture in nearly equal proportions of their separate characters. Among animals there is an instinctive preference for sexual union with their own species rather than with others. A certain degree of similarity in the physical structure of the parents is essential to the fertility of their sexual union. Thus all the most frequent and most useful forms of hybridity occur between different species belonging to the same genus. The horse, for example, will breed with the ass, the zebra, and the quagga; the dog has been certainly known to breed with the wolf, and probably with the fox; the goat with the sheep, the ram with the roe. As a rule it may be said that hybrids are not fertile. Thus the mule does not reproduce itself, but is only obtained by a repetition of the union of the ass and the mare. The female mule will, however, sometimes reproduce by union with either the horse or the ass.

The terms hybrid and hybridization are often vaguely used as applied to plants, and many are called hybrids which are only crosses between varieties. The name hybrid should be restricted to plants resulting from the seeds of one species fertilized by the pollen of another species; those forms produced by cross breeding between varieties of the same species should never be called hybrids, but crosses. It makes a difference also which plant is chosen as the

seed bearer and which as the pollen bearer; for instance, the pistil of A will refuse to be fertilized by the pollen of B, while the pistil of B will readily accept the pollen of A. Among hardy flowers, the rhododendrons and azaleas are striking examples of the improvement that may be effected in this manner; the fine rhododendrons are hybrids between the hardy *R. Catawbiense* of the S. Alleghanies and *R. Ponticum*, a greenhouse species from Asia Minor.

Hydaspes (hī-dās'pēs), name by which the Greeks and Romans designated the present Behat or Jhilum River, an affluent of the Ganges. On its banks was fought the great battle between Alexander the Great and Porus, 327 B.C., and on its banks Alexander founded the cities Nicæa and Bucepala.

Hyde, Anne, 1637–71; mother of two queens of England; daughter of Edward Hyde, Earl of Clarendon; lived at The Hague as maid of honor to the Princess of Orange, sister to Charles II and James II. Here James, at that time Duke of York, formed a *liaison* with her, and shortly after the restoration of his family to the throne of England (1660) married her clandestinely. For some time the royal family would not recognize her, and there was much intriguing for the purpose of breaking the marriage; but Anne's perseverance at last conquered all difficulties. She was very prepossessing, spirited, and dignified, and exercised a great influence on her husband. She was a Roman Catholic, and converted him. Her two daughters, however, Mary and Anne, who both became queens of England, were educated in the Protestant religion.

Hyde, Edward. See CLARENDON.

Hyde, Thomas, 1636–1703; English Orientalist; b. Shropshire; was Archdeacon of Gloucester, Bodleian librarian and Prof. of Arabic and Hebrew at Oxford, and interpreter of Oriental languages to the court under Charles II, James II, and William III; most important work, "Veterum Persarum et Medorum Religionis Historia"; his proficiency in Persian, Arabic, and Syriac made him a most valuable assistant in editing the Polyglot Bible of Walton.

Hyde Park, inclosure comprising 400 acres, and extending W. from the district of Mayfair to Kensington Gardens, London; was originally part of the manor of Hyde, which was attached to Westminster Abbey. When the monasteries were dissolved under Henry VIII, these grounds became the property of the crown, and after the Restoration became the favorite drive and promenade of Londoners.

Hyderabad (hī-dĕr-ä'bäd). See HAIDARABAD.

Hyder Ali (hī'dĕr ä'lē), abt. 1718–82; Sultan of Mysore; b. Bangalore; entered the service of the Rajah of Mysore, 1749; rose in the course of ten years to be commander of the forces; and shortly after set aside the rajah, took possession of the sovereignty, and greatly increased its extent. The E. India Company, alarmed at his power, made war on him with native aid, 1767. He fought with great success; suddenly appeared before Madras; and, the surrounding country being at his mercy, compelled the government to make a defensive alliance with him, April, 1769. The English having refused the promised aid in his succeeding wars with the Mahrattas, he ravaged their territories for two years, and died during negotiations for peace; succeeded by his son Tippoo Sahib.

Hy'dra, island off the E. coast of Morea, Greece; 11 m. long and 3 m. broad; is high, rocky, and bare, and almost all its inhabitants live in the town of Hydra, on the N. coast. The island was uninhabited in ancient times. In the fifteenth and sixteenth centuries fugitives from Albania, Argolis, and Attica, who fled from Turkish oppression, founded the city, and it soon became an important commercial center. The Hydriotes did valiant service in the war for independence, and their bravery has been extolled by many poets. The prosperity of Hydra was brief, and the population, which, 1813, was estimated at 50,000, is now less than 7,000.

Hydra, in Greek mythology, a water serpent with many heads, usually given as nine in number, of which the middle one was immortal. Heracles drove the serpent from its lair by means of hot arrows, and then, with the help of his friend Iolaos, succeeded in killing it. As he cut off the several heads, each wound was seared with a firebrand. Lastly the immortal head was cut off and buried beneath a ponderous rock. Heracles dipped in the poisonous blood of the Hydra his arrows, which thereby became deadly. Heracles was wounded in the combat with the Hydra, and was healed only by a plant that grew in Phœnicia, and at last he himself found his death through the blood of Nessus, which had been infected by the poison of the Hydra.

HYDRA.

Hydra, one of the few fresh-water cœlenterates belong to the order *Hydroida* (*q.v.*), and receiving its name from the fact that it is frequently found with buds, recalling the Hydra of mythology. Hydra occurs in fresh water in various parts of the globe. It consists of an extensible body, the terminal mouth being surrounded by a varying number of tentacles. It is about the simplest form of many-celled animals.

Hydra, ancient S. constellation representing the sea serpent; of Babylonian origin; lying S. from Cancer, Leo, and Virgo; has one star of the second magnitude and about 400 visible to the naked eye; on the meridian at 9 P.M. in April.

Hydrangea (hī-drăn'jē-ä), genus of shrubs of the family *Saxifragaceæ*. The U. S. have three (S.) species all elegant shrubs in cultivation—*Hydrangea radiata, arborescens,* and *quercifolia*. The common hydrangea of the greenhouse is *H. hortensia* of China. It is re-

markable for the mutable color of its flowers. It requires peaty earth and plenty of water, and is very hardy. *H. thunbergii* furnishes

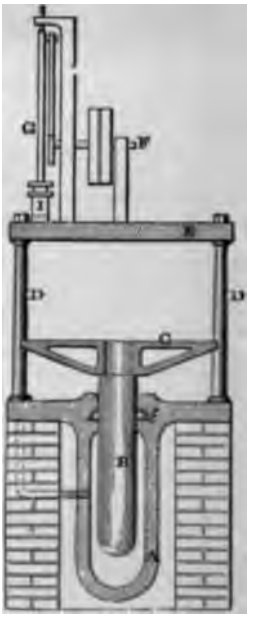
GARDEN HYDRANGEA.

leaves which are highly prized in Japan as a substitute for tea. *H. haniculata*, of China, is the common hardy species. There are other species.

Hy'drates, compounds that are derived from water, or that are formed by direct combination with water. Water consists of hydrogen and oxygen in the proportions represented by the formula H_2O. If half of the hydrogen is replaced by something else, the product is called a *hydrate* or a hydroxide. A simple example of such a replacement is that which takes place when sodium acts on water. Hydrogen is given off, and a compound of the formula NaOH is formed, *i.e.*, half the hydrogen is replaced by sodium, and the compound formed is called sodium hydrate or sodium hydroxide. Other examples are potassium hydrate, KOH; calcium hydrate, $Ca(OH)_2$, or slated lime; ferric hydrate, $Fe(OH)_3$, sometimes called hydrated oxide of iron. The examples given all belong to the class of compounds known as bases, which consist of a metal in combination with hydrogen and oxygen. Most acids are also hydrates or derivatives of water, but they contain, in place of the metal which is characteristic of the bases, a group of elements one of which is generally oxygen. Alcohols are hydrates in the same sense as acids and bases, and they resemble the metallic bases in their chemical conduct. Some substances unite with water directly and form well-defined products, the nature of which is not understood. The numerous cases of salts with water of crystallization furnish illustrations of this class of compounds. They are sometimes called hydrates.

Hydraulic (hi-drâ'lik) **En'gines,** engines operated by water under pressure. The usual, and generally the most eligible, mode of employing water power is to apply it to the circumference of a wheel. Occasionally, however, it may be more advantageous to use it as steam is used, acting on a piston in a cylinder. This mode of application is especially adapted to the case of a small supply of water having a large fall. Hydraulic engines, like steam engines, may be either reciprocating or rotary. Some modifications are necessary in the construction of the parts, to accommodate them to the different physical properties of the denser fluid. The feed and escape pipes, for instance, must be larger than are required for steam, and should have no abrupt angles. Freer passages also are necessary; the eduction or escape valve should open very promptly at the end of the stroke, and the induction or feed valve should not close until the stroke is quite completed—that is to say, the influx should cease and the efflux should begin exactly at the same moment. The simplicity and neatness of hydraulic engines render them preferable to almost any other form of small motor wherever the water power can be easily secured; but in general it is not a natural hydraulic head that is depended on; and indeed no natural head could furnish, in machines of so small model as those employed in foundries, anything like the large power which they exert. The head is established in an *accumulator* of power, which is a body of water driven into a reservoir under heavy pressure by forcing pumps worked by steam. In cities in which the water distribution is from elevated reservoirs, and in which the water supply is sufficiently abundant to justify the application of a portion of it to industrial uses, the water engine is recommended by the combined advantages of simplicity, neatness, compactness, constant readiness for work, perfect safety, economy while working, and the absolute cessation of expenditure during interruptions.

Hydraulic, or Bramah (brä'mä) **Press,** machine employed for producing great pressures. The action of the hydraulic press depends upon the principle that fluids press equally in all directions. When a fluid is confined, if the intensity of pressure in one part be increased, as by forcing in a piston, an equal increase will be produced in the intensity of pressure in all other parts and will be transmitted to a larger piston increased in the same proportion in which the area of the larger piston exceeds that of the smaller.

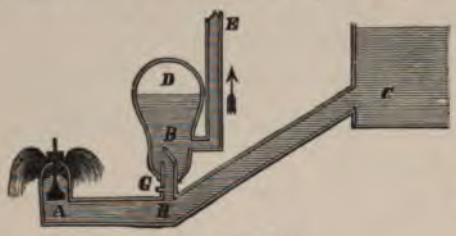


HYDRAULIC PRESS.

The accompanying illustration shows the main features of this machine. A is a very

thick and strong cylinder, generally of cast iron. A broad flange surrounds its mouth, resting upon masonry. B is the plunger, with a water-tight packing at *f*. It carries the platform C, on which is placed the body to be submitted to pressure. E, a very strong plate confined by the uprights D D, receives and resists the pressure exerted by B. F is a shaft turned by a belt and pulley, which, by means of an eccentric, works the plunger G of the force pump I. The water forced into the chamber inclosed by A, by means of the force pump G, through the shaft D, causes the shaft B to rise a distance proportioned by the quantity of water admitted and with a force determinable by the ratio between the square of the diameter of the cylinder B and that of the force pump.

Hydraulic Ram, machine for raising water by employing its own momentum, acquired by a fall, a portion of the water only being raised. The accompanying diagram will explain its action. An impulse pipe, H, leads from a cistern or reservoir, C. The lower end of the pipe turns up at A, where there is a large valve opening downward, which will shut only when the water in the pipe has acquired a certain momentum. When it shuts, the motion of the water at A is arrested, but between H and C it is not, because the valve at B, opening upward,



HYDRAULIC RAM.

allows a portion to ascend into the chamber D. When the impulse is expended the valve falls. The valve A also falls, when the water again rushes through it, until its force again shuts it, and the passage of water into the chamber D is repeated, until it finally rises to a height in the pipe E which may be proportional to the impulse of the water in the feed pipe. These are the essential features of the machine. The invention of the hydraulic ram is ascribed to the elder Montgolfier, and its improvements to his son. The principle, however, was previously employed by John Whitehurst, of Cheapside, in a machine constructed by him, 1772. In place of the automatic valve A there was a stopcock which required to be opened and shut.

Hydrau'lics, the science of water flow. By means of its laws, which are partly theoretical and partly experimental, we may calculate the flow of water through orifices, pipes, or open channels, and study the pressure exerted by moving, as opposed to standing water, etc. Considered as a branch of engineering, hydraulics deals with the measurement, control, and utilization of flowing water. In measuring water flow, the hydraulic engineer is aided by such laws as (1) that of Torricelli, 1664, stating that the velocity of water issuing from an orifice in a vessel's side equals that acquired by a body falling to the orifice from the water surface; (2) the rule that a water jet contracts as it leaves the orifice, making its actual flow less than the theoretical by the factor 0.615; (3) that pressure in a pipe is lessened when the water is in flow, and may even become negative, that is, from without inward. Flow of water through piping is often much less than the theoretical amount, owing to contraction at the entrance and to the friction of the pipe itself. This latter increases with the length of the pipe, so that in a long conduit the "head" may be entirely lost. When the water, instead of running through piping, is conducted by means of an open channel, the flow is usually measured by means of a weir—a rectangular orifice in the edge of a dam. The material of the channel affects the flow; thus, over brick or ashlar, water runs only seventy-seven per cent as smoothly as over cement or planed wood; over rubble, fifty-eight per cent; over earth, forty per cent; over gravel or vegetation, thirty-three per cent, and in very rough channels only twenty-five per cent as smoothly.

Direction of flow by orifices, pipes, or channels may be said to be the most elementary form of control. The velocity may be varied by introducing obstructions, which, when they close the channel entirely, stop the flow. Such are gates in open channels and the various kinds of valves in pipes. A familiar form of automatic control is the ball valve, in which an empty sheet-metal ball floating on the surface of water in a tank is connected with mechanism that shuts off the flow when the surface reaches the desired height. The utilization of hydraulic laws and devices appears in all cases where water is to be used, either in itself or to operate machinery by its weight, or to effect something by the force of its impact, as in hydraulic mining. Hydraulic laws govern the arrangement of plumbing in a house, of water motors of all sizes from the great Niagara turbines to the small house motor for driving a sewing machine, and of channels for carrying water, whether natural, as in river improvement, or whether artificial, as in canals for navigation or for irrigation. See ENGINEERING; HYDROSTATICS; WATER.

Hydrocar'bons, compounds consisting of the elements carbon and hydrogen. They occur widely distributed and in immense quantities in nature, as in petroleum, in the gases that issue from the earth in coal mines and in the neighborhood of petroleum wells, in many essential oils, as oil of turpentine, caoutchouc, etc. The principal method of obtaining the hydrocarbons on the large scale is by the destructive distillation of organic substances. Coal tar, which is a by-product in the manufacture of illuminating gas, contains a number of very valuable hydrocarbons, which are separated and purified, and find extensive application in chemical industries. About 200 hydrocarbons are known, belonging to about a dozen

classes or series. The simplest hydrocarbon known, as far as composition is concerned, is marsh gas, or methane.

Hydrochlo'ric Ac'id, called also CHLORHYDRIC ACID and MURIATIC ACID, and anciently "spirit of salt," gas which escapes when common salt (sodium chloride) is treated with sulphuric acid. In the manufacture of sodium carbonate, salt is treated with sulphuric acid, by which it is converted into sodium sulphate. In this stage of the process hydrochloric acid is formed in large quantity. The waste gases are made to pass through towers filled with bricks so arranged as to present a maximum of surface, over which water is kept constantly passing. The gas dissolves in the water and the solution thus obtained is commercial hydrochloric or muriatic acid. The pure acid is made by passing the pure gas into distilled water. Hydrochloric acid gas is colorless and transparent. In contact with air it forms clouds, owing to its great power of combining with water. It has a sharp, penetrating smell and taste, and when inhaled causes suffocation. The gas does not burn, nor does it support combustion. Hydrochloric acid finds extensive applications in the laboratory and the arts, especially as a source of chlorine in bleaching. Hydrochloric acid is secreted by the cells lining the stomach, and has an important function in digestion.

Hydrocyanic (hī-drō-sī-ăn'ĭk) **Acid,** or **Prus'sic Acid,** a most deadly poison to both animals and plants. In the undiluted state it is one of the most active destroyers of life known, a single drop put on the tongue killing a large dog in a few seconds, and death being even caused by breathing its fumes. Even the medicinal preparation, a dilute aqueous solution containing two per cent of the pure acid, is a violent poison, and must be used cautiously. Medicinally the dilute acid is useful to arrest nausea and vomiting, allay cough, and, locally applied, to relieve irritation and itching of the skin.

Hydrodynam'ic En'gines. See HYDRAULIC ENGINES.

Hydrofluor'ic Ac'id. See FLUORINE.

Hy'drogen, one of the elements, a gas, having neither color, taste, nor odor. It was known near the close of the seventeenth century, and was termed inflammable air from its burning with a flame; it was also called phlogiston, from the supposition of its being the matter of heat. Its real nature was first described by Cavendish, 1766. Many authorities assert that hydrogen is never found free in nature on the earth. It certainly exists, however, in volcanic gases. Graham found it, in the condition he called "occlusion," in the iron of aërolites. De Candolle made the statement that certain fungi evolve free hydrogen night and day. The spectroscope detects hydrogen in the chromosphere of the sun and in many other stars; also in certain nebulæ. Water contains one ninth of its weight, or 11.11 per cent, of hydrogen. Hydrogen occurs also in nature in combination with nitrogen, as ammonia; with carbon, as marsh gas, the chief constituent of the gas of gas wells and of the fire damp of coal mines, which, of all known compounds, is the richest in hydrogen, containing one fourth of its weight, or more than twice as much as water. It also contains twice its own volume of hydrogen. Hydrogen occurs with carbon also as petroleum and paraffin; and as an essential constituent of most of the solid tissue of organic beings, both animal and vegetable; and therefore of all mineral substances of organic origin. In volcanic gases it occurs as muriatic acid gas; also as sulphuretted hydrogen under many circumstances.

Hydrogen gas may be obtained from water by many methods. The method of Paracelsus, with iron (or zinc, which is oftener now used) and a dilute acid, generally either sulphuric or muriatic acid, is the most common method, but yields generally an impure hydrogen, contaminated by the impurities of the metal and acid used. It is also obtained by electrolysis of water containing in solution some substance which increases its conducting power for the voltaic current. Pure hydrogen is then evolved from the cathode or negative electrode. When freshly evolved or in its "nascent" state hydrogen has more active powers of combination with other elements. Hydrogen is also a product of the destructive distillation, at incandescent heats, of all organic substances. Thus common coal gas contains forty per cent or more of this gas. Hydrogen is the lightest known gas, and, therefore, the least dense of all known substances. Air being 1, its density is 0.0693, but water being 1, its density is only 0.00008974. Hydrogen when subjected to a temperature lower than $-240°$ is converted into the liquid form, and it has been found possible, by hastening the evaporation of this liquid, to lower the temperature sufficiently to produce congelation. The tenuity of hydrogen gas gives it a great penetrative or rapid *diffusive* power; many solid metals are readily penetrated or permeated through their pores, iron being one of these.

Hydrogen, in its tendency to combine directly under normal pressures and temperatures with other elements, is almost as passive and inert as nitrogen; the only element toward which it manifests much activity being chlorine. With this it does not combine spontaneously in the dark, but light causes an immediate combination to form hydrochloric-acid gas; and direct sunshine will even set up rapid and explosive combustion. When mixed with oxygen or air no combination takes place spontaneously, but contact with certain metals causes a condensation and combination, to form water, on the surfaces of such metals, developing heat; which may easily be so managed as to raise the metal to incandescence, and thus cause the gaseous mixture to kindle throughout, with explosion if confined. This phenomenon furnishes the principle of what is known as Döbereiner's "hydrogen lamp." At temperatures higher than normal, hydrogen will combine with some other elements, as with sulphur at the boiling point of the latter, to form sulphureted hydrogen, and with bromine and

iodine, at a red heat, to form the corresponding hydracids. Even with carbon, at the intense temperature of the voltaic arc, a tendency to direct combination was developed, one product being acetylene gas. Hydrogen combines with nitrogen to form ammonia, and with carbon forms the important series of compounds known as hydrocarbons, in which a jet of hydrogen, mixed with air, is forced against a mass of spongy platinum, which becomes red hot and kindles the hydrogen.

Hydrogen Perox'ide, called also BIOXIDE, BINOXIDE, DIOXIDE, DEUTOXIDE OF HYDROGEN, and OXYGENATED WATER, discovered, 1818, by Thenard. He found, when peroxide of barium was added in the cold to dilute hydrochloric acid, instead of decomposition, such as might have been anticipated a new compound was formed, containing twice as much oxygen as water. He finally obtained the hydrogen peroxide almost free from excess of water. The resulting product is transparent and colorless, with a density = 1.452, nearly half as high again as water; not freezing at 22° F. below zero; tastes like tartar emetic; and makes itching sores on the skin. It breaks up spontaneously at ordinary temperatures into water and free oxygen when pure, but the presence of acids makes it more stable, and that of alkalies less so. Cold preserves it. By suddenly heating it to the temperature of boiling water oxygen is evolved with explosive rapidity. Mere contact with certain substances, as charcoal, some metals, and some oxides, sets up violent decomposition, often with strong evolution of heat. On many substances it acts as a powerful oxidizer, converting them into their highest oxides. On the other hand, on another class of substances this peculiar compound actually operates as a powerful reducer; oxygen being evolved simultaneously from the oxide operated on and from the peroxide of hydrogen itself.

Hydrogen peroxide bleaches indigo and decomposes iodide of potassium, with liberation of iodine. It can be used for restoring paintings which have become dim through the conversion of the white lead carbonate used in the pigments to black sulphide of lead. The latter is converted by it into white lead sulphate. It is used for bleaching human hair, ostrich feathers, bones, ivory, silk, wood, cotton, etc. It is valuable in medicine, as it destroys organic poisons and disease germs, being especially useful in diphtheria and all forms of ulcers and suppuration.

Hydrog'raphy, science which, by representation of the figure of the bottom of the ocean and its tributaries, by means of soundings, by observations of tides and currents, and by investigations of the winds and their action and of the law of storms, aims to diminish the risk attending the navigation of dangerous waters. The results of these investigations are shown on charts, which give the outlines of the coasts and harbors, the depths of water in the navigable channels, the rocks and shoals with the soundings on them, and various tidal and magnetic information. In the course of the investigations specimens of the bottom are also obtained by apparatus attached to the sounding lead; and the temperature of the water is frequently taken as an additional guide to determine the mariner's position.

By far the greater part of the hydrographic work that is going on is under the direction of the naval authorities of the various maritime nations. The hydrographic office of the Navy Department of the U. S. includes within its jurisdiction the cartographic, hydrographic, and marine meteorologic publications of the U. S. relating to the oceans and to foreign coasts; the execution of the marine surveys which the Navy Department is authorized by Congress to undertake; the receiving and taking charge of the results of surveys and of all remark books and hydrographic information from all nautical sources, home or foreign; and the compilation and publication of such information in the form of charts and notices to mariners. Hydrographic work forms an appropriate part of the duties of naval vessels in time of peace. Each of the principal maritime nations has one or more naval vessels expressly fitted up and detailed for this sort of work, and every vessel in commission has orders to take advantage of every possible opportunity to verify and correct its charts and sailing directions. In addition to such naval vessels, work is done by the steamers and sailing vessels of the U. S. Coast and Geodetic Survey, as well as the steamer *Albatross*, belonging to the U. S. Commission of Fish and Fisheries, which are officered and manned by the navy, although not under the naval administration.

Hydroi'dea, lowest order of acalephs or jelly fishes, including two distinct forms, one resembling polyps, the other like the jelly fishes, there being every possible gradation between the two. The common green hydra of fresh

HYDRA ATTACHED TO PLANT.

water (*Hydra viridis*) is easily seen by the naked eye; the body is a cylindrical tube, with thread cells, and a green coloring matter; at the base is a disklike sucker for its attachment to foreign bodies; it is usually suspended head downward, from some aquatic plant. The mouth is at the opposite end, surrounded by

five to fifteen very contractile tentacles, armed with lasso cells, hollow, and communicating with the general and stomachal cavity of the

FRESH-WATER HYDRA SLIGHTLY CONTRACTED.

a. Point of attachment. *b*. Bud. *m*. Mouth of parent hydra. *t*. Tentacles.

body; by these they obtain their food, which consists of minute aquatic animals. There are no internal organs of any kind, and they are therefore very little higher than the protozoa.

Hydrom'eter, Areom'eter, or **Gravim'eter,** an instrument primarily for determining the specific gravity of liquids. It consists of three parts: (1) a graduated stem of uniform diameter and cross section; (2) a bulb; (3) a counterpoise or ballast. On being placed in a liquid it sinks until a certain point on the scale is on a level with the surface of the liquid, and from the reading of the scale at that point the specific gravity of the liquid is either ascertained directly or by a simple calculation. The principle of the hydrometer is that of the law of floating bodies—*viz.*, that when a body floats the weight of the bulk of liquid displaced is equivalent to the weight of the body floated. The bulb is put on in order that the instrument may float, and the counterpoise or ballast insures its floating in an upright position. The stem is of small diameter, in order that small differences of specific gravities in liquids may show considerable differences on the scale.

HYDROMETER.

Hydropho'bia, or **Rabies** (rā'bĭ-ēz), acute disease of warm-blooded animals dependent upon a specific virus and communicated by inoculation to man. Dogs are especially liable to it at all seasons of the year, not merely in hot weather. The nature of the poison is unknown, but it seems to be contained chiefly in the nervous system and some of the secretions, as the saliva. Two early signs of rabies in the dog are a peculiar delirium, causing the animal to snap at imaginary objects, and a remarkable alteration in its voice, the bark ending abruptly and singularly in a high howl. Sometimes it will utter a hoarse inward bark, rising slightly in tone at the close. Common symptoms are squintings and twitchings of the face. In a day or two the animal begins to lose control of its muscles, and experiences difficulty in eating and drinking. In the early stages frothy saliva is seen dripping from its jaws, but this soon lessens in quantity and becomes thick, and adheres to the corner of the mouth and causes intense desire to drink. The progress of canine rabies is rapid, and its termination almost always fatal. Its duration rarely exceeds from four to six days.

After the bite there is an incubation period which in man varies from six weeks to two months and even longer. Then the patient feels a tingling sensation about the bite with pain or numbness. He grows irritable, with a sense of impending danger. He has difficulty in swallowing, and a bright light or loud noise distresses him. Then follows a stage of excitement, in which there are spasms. Any attempt to take water causes a painful spasm of the throat. Between attacks the patient is quiet and his mind clear. As the paralytic stage comes on the patient becomes quiet, unconsciousness supervenes, and death occurs by syncope. When once established the disease is hopelessly incurable, so that all persons bitten by suspected animals should immediately subject themselves to the preventive inoculation devised by Pasteur.

This is based on the fact that the medulla and spinal cord of a rabid animal hung in a dry sterilized atmosphere (as in a protected jar) for ten days loses its virulence, while those exposed for shorter lengths of time lose it in proportion to such time. Emulsions or extracts are accordingly made from cords exposed for one, two, three, or more days, up to ten. If, now, an animal is inoculated with an emulsion from a harmless cord he can next day receive an injection from a cord nine days old, on the next day from one eight days old, etc., until on the tenth day an injection prepared from the fresh cord of an animal just dead from rabies produces no effect. In other words, an artificial immunity has been conferred. This principle is applied to human beings with great success. In 1903, of 1,103 persons treated, only two died. Failure has been for the most part due to delay in submitting to the treatment promptly enough, or at least eight or nine days before the first sign of the disease. Rabbits are the experimental animals most commonly used for keeping up a supply of virus, and the disease is inoculated by trephining and inserting the virus under the brain covering. A false form of rabies (pseudo-hydrophobia) occurs in nervous and hysterical people who have been bitten by some animal. They reproduce many of the symptoms of true hydrophobia, and are very emotional. Cure, however, follows proper treatment. In England the order muzzling all

dogs has been followed by a complete disappearance of the disease.

Hydrostat'ics, science which treats of the mechanical properties of fluids in a state of rest, the science of hydraulics treating of the laws of the flow of fluids. A fluid is a body which offers no resistance to a change of form. Fluids are of two kinds: (1) elastic fluids, which may be compressed to any extent by a sufficient force, recovering their original volume on the withdrawal of the force; (2) liquids which, though strictly speaking, admitting of slight compression, are for all practical purposes to be regarded as incompressible. In the present treatment of hydrostatics, water is considered as the representative of the various liquids, because what is true of it is substantially true of any other liquid. Water is slightly compressible. Up to a pressure of sixty-five atmospheres the compression is proportional to the pressure, and its volume is diminished about $\frac{50}{1000000}$ by a pressure of one atmosphere, or 14.7 lb. per sq. in., by which the volume of air would be reduced one half. Water is expansible by heat. Its exact weight per cubic foot depends on its temperature. For ordinary temperatures, and for calculations not requiring great exactness, the weight of water may be taken at 62½ lbs., or 1,000 oz. per cu. ft. Water expands about $\frac{1}{11}$ of its volume in freezing. 1 cu. ft. ice = 57.5 lb.

In consequence of the mobility of the particles of a liquid over each other, they yield to the force of gravity, and therefore when at rest present a level surface; and for the same reason each particle, and therefore each portion of the liquid, must exert and receive equal pressures in all directions. If a vessel with a horizontal bottom be filled with water to a depth of a foot, every square foot of its bottom will sustain a pressure of 62.37 lbs.; every square inch will sustain a pressure of 62.37 ÷ 144 = 0.433 lbs. This pressure is due to the weight of the water. If an additional pressure be applied to the surface, the pressure at any point within the vessel will be increased by the same number of pounds per square inch. Such an additional pressure is always present, consisting in the weight of the atmosphere, which in its ordinary state, at heights not far above the sea level, exerts a pressure of 14.7 lbs. per square inch. Thus the absolute pressure at any point within a vessel is that due to the superincumbent water, increased by 14.7 lbs. per square inch.

These considerations apply to vessels having free communication with the atmosphere. The pressure in confined vessels depends on other conditions. In a steam boiler, for instance, the pressure depends on the tension of the steam, and this, again, on the temperature. It is often convenient to reduce such pressures to an equivalent head of water by dividing the pressure in pounds per square inch by 2.3. To find the pressure on a horizontal immersed surface multiply the area of the surface by the pressure due the head. Thus the pressure on a horizontal area 100 sq. in. in extent lying 10 ft. below the surface of the water is 100 × 10 × 0.433 = 433 lbs. When the given surface is vertical or inclined, however, the question is not so simple, the head being different on different parts of the surface; and when the surface is bounded by curved lines, the operation becomes very complicated. In considering pressures on curved surfaces, the object usually is to find the resultant pressure, or that with which the fluid tends to give motion to the surface, or to resist its motion in some particular direction, usually horizontal or vertical. The pressure acting on a curved surface in any given horizontal direction is the same as would be exerted on the projection of the surface on a vertical plane perpendicular to the given direction. The pressure on a curved surface in a vertical direction is equal to the weight of the mass of water lying vertically above the surface.

The upward pressure on an immersed solid tends to raise it; the downward pressure tends to sink it. This latter is equal to the weight of the mass of water lying vertically above the upper surface. The excess of the upward over the downward pressure is equal to the weight of the mass of water displaced by the solid. If the weight of the solid is less than this, it floats; if greater, it sinks. In either case the weight lost by the body is equal to that of the mass of water displaced by it. This property is employed in determining the relation between the weight and volume of solid bodies. When a solid floats in water, it takes a position such that its center of gravity is in the same vertical line with the center of gravity of the fluid displaced by it. This position is called a position of rest or equilibrium. Most floating bodies have more than one position of rest. A position of rest is said to be stable when the body tends to return to it on being tilted or inclined; unstable, when it tends to rotate into another position. The theory of the stability of floating bodies is of the greatest importance in shipbuilding.

From the principle of equilibrium of fluids, that the surface of the liquid at rest must be a level which is perpendicular to the direction of the force of gravity, it follows that when two or more forces act on a liquid to change the position of its surface, the resultant of these forces will be perpendicular to the surface. Therefore, if a cylindrical or conical vessel containing a liquid is rotated on its axis, all the particles on the surface will be acted on by two forces, that of gravity, in a vertical direction, and the centrifugal force, which is horizontal, and varies in intensity with the distance of the particles from the axis or center of motion. The surface of the liquid will therefore be depressed in the middle, and form a parabola. See HYDRAULICS.

Hydrostatic Press. See HYDRAULIC PRESS.

Hydrother'apy, use of water in the treatment of disease; has been used in the sense of a school of medicine, and some practitioners limit their practice to hydrotherapeutics. Though methods of water cure are as old as the history of medicine, no systematic attempt was made to introduce bathing or other forms of hydrotherapy into general practice until

the close of the eighteenth century, when Wright and Currie and Jackson advocated bathing in fevers; but the treatment fell into disuse, and was not revived and set on a lasting basis until it was advocated by an ignorant person. Vincent Priessnitz, a small farmer of Graefenberg, Silesia, had experienced the benefit of cold affusions in the case of a sprain, and was led to engage in the practice of water curing in all kinds of acute and chronic diseases, and established the noted institution at Graefenberg, 1839.

Priessnitz introduced a number of modifications of the simple bath, such as the pack, in which the patient is wrapped in a sheet saturated with water; the partial baths, as foot bath and hip or sitz bath; the rubbing with a wet sheet, and others. He also directed the abundant internal use of water, believing that disease depends on an acrid humor which might in this manner be eliminated. Naturally, with this treatment and the active exercise and restricted diet entailed, many persons were cured, but others were as distinctly injured. Numerous hydropathic establishments sprang up on the continent of Europe, in Great Britain, and in the U. S., and the treatment was in some cases carried to the ridiculous limits of the grossest quackery. Finally, a few institutions were placed under the care of educated physicians, and the effects of water on the human system were studied scientifically. Hydrotherapy is now regarded as a well-grounded branch of treatment.

The free drinking of water aids in carrying off effete matters through the skin and kidney, and is of great value in gout, Bright's disease, etc. But water should not be drunk at such times or in such quantities as to dilute the gastric juices and interfere with digestion. Water should be taken between meals, in moderate quantities, frequently repeated, rather than in copious draughts, and should not be extreme in temperature.

Hye'na, digitigrade carnivorous mammal, most numerous in Africa, but found also in S. and middle Asia, where the genus has probably spread while following the track of armies and caravans. The disposition of the hyena is fierce and cowardly, and its habits are revolting; it is able to withstand any temperatures and privations, revels in the foulest air, and gorges on the filthiest substances when living prey fails; of powerful form, thick skin, and strong jaws and teeth, the bands of hyenas fear not the lion and tiger, and will attack even man in the night time. The feet are all four toed, with strong nonretractile claws fitted for digging. The prevailing color is an ochrey gray, with dark stripes or spots. Its odor is disgusting, and its voice, heard at night, resembles a horrible laugh. The hyena is among mammals what the vulture is among birds, the scavenger of the wilderness, the woods, and the shore, and useful in this way in disposing of carcasses which otherwise would pollute the air. Three living species are known; two of these are from S. Africa—viz., the brown hyena, with the fur clouded and rather long, and legs of nearly equal length; and the spotted hyena, having the hinder legs short. The striped or banded

Striped Hyena.

hyena ranges over Africa and S. Asia. No species of hyena, recent or fossil, is yet known from the continent of America.

Hygeia, or **Hygea** (hī-jē'yā), in Greek mythology, the goddess of health, a daughter of Æsculapius; was represented as a virgin in flowing garments feeding a serpent from a cup. By the Romans she was identified with the old Sabine goddess Salus.

Hygrom'etry, method of determining the amount of moisture in bodies, more especially in atmospheric air. A hygrometer is an instrument used for this purpose; and a hygroscope is any substance that absorbs moisture from the air, and so is changed in form or weight. Various salts absorb moisture and deliquesce, and are consequently called hygroscopic. These serve as hygrometers in chemical analysis; thus chloride of calcium placed in a glass tube absorbs the moisture from the air passed through the tube, and its increase of weight determines the quantity. Many solids change their bulk and form by absorbing or parting with moisture. In this respect human hair is remarkable, when cleansed by boiling in alkaline water. In this state it was used by De Saussure for a hygroscope. It is wound over a wheel which moves an index, a weight being attached to one end. When it is dried to a certain degree, the zero of the scale is found; by saturating with moisture, the other extreme of the scale is found.

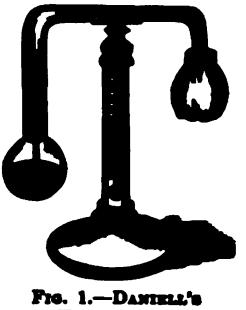


Fig. 1.—Daniell's Hygrometer.

A more exact method of determining the relative humidity of the air is to ascertain the dew-point. Various forms of the dew-point instrument or hygrometer have been devised.

In Daniell's, a bent tube with a bulb at each end is suspended, with the bulbs hanging downward; one bulb contains ether, in which is placed the bulb of a delicate thermometer; the rest of the tube contains only the vapor of ether, and the other bulb is covered with muslin, which is moistened with ether. This condenses the vapor within, and causes rapid evaporation of the ether in the other bulb, and consequently a reduction of temperature to a point at which the moisture of the air condenses on the outside of the tube on a level with the surface of the ether. This is shown by the inclosed thermometer, while the temperature of the air is shown by an independent thermometer. *The wet and dry bulb hygrometer* (known as Mason's hygrometer, also as August's psychrometer) is shown in Fig. 2. It consists of two thermometers, the bulb of one of which is encompassed in wicking. The wet bulb is moistened by capillarity of the wick, the lower end of which is immersed in liquid. Evaporation takes place at a rate which depends upon the humidity of the surrounding air. The resulting fall of temperature of the wet bulb serves to indicate the condition of the atmosphere as regards moisture by means of tables published for that purpose.

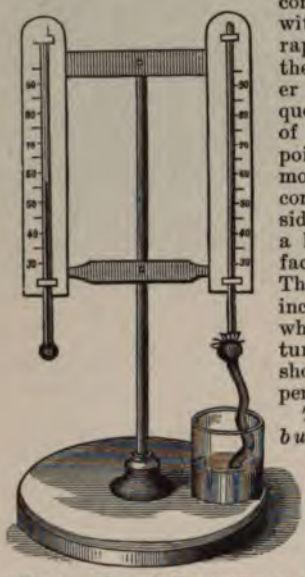


FIG. 2.—MASON'S HYGROMETER.

Hyk'sos ("shepherd kings"), name given by Manetho to the kings of the fifteenth, sixteenth, and seventeenth dynasties in Egypt. Their capital was Tanis in the delta, the "Zoan" of the Old Testament, now called Sân. Important discoveries made there by Mariette throw much light on this obscure portion of Egyptian history. The Hyksos were not, as some have supposed, the Hebrews, but probably a collection of the nomadic hordes of Arabia and Syria, mostly Canaanites. They were not mere savage conquerors, but adopted Egyptian manners and customs and worshiped Egyptian gods. They held the country for about five hundred years—according to Mariette, from abt. 2200 B.C. to abt. 1700 B.C.; Poole and Wilkinson say from abt. 2000 to abt. 1500 B.C. The present inhabitants of Sân and the shores of Lake Menzaleh have exactly the same Semitic cast of features as compared with the regular Egyptian type.

Hy'las, in Greek mythology, son of the Dryopian Theiodamas. Because of his beauty he was beloved by Heracles, who murdered the father, kidnaped the boy, and took him along on the Argonautic expedition. Owing to a broken rudder the heroes made a halt on the coast of Mysia. The nymph of the spring Pegæ, to which Hylas went to get water, fell desperately in love with him, and dragged him down into her waters. Polyphemus heard the cries of Hylas, drew his sword, and ran in the direction of the cries, and meeting Heracles could only tell him the story. Glaucus, the sea god, told the Argonauts that Hylas had become the husband of the nymph, and so they sailed away, leaving Heracles and Polyphemus behind. Polyphemus remained there, and became king of the country. Heracles forced the Mysians to give him hostages that they would search for Hylas, a ceremony which was ever observed throughout the country.

Hy'men, in Greek mythology, the god of marriage. According to some, he was a son of Apollo and one of the muses; but according to others, he was a mortal, who, having rescued some Attic maidens from robbers, had his praises celebrated in their bridal songs, called hymeneal songs. The practice of singing such songs at the nuptial season became in time universal, and he was gradually elevated to the rank of a divinity. He is represented in art as a handsome young man, with a tender, effeminate frame, dreamy, longing eyes, and long hair. He carries a torch and wreath.

Hymenop'tera, suborder of insects, so named from their four membranous, transparent wings. They include the bees, wasps, ants, ichneumon flies, saw flies, etc., which are described under their respective titles.

Hymettus (hĭ-mĕt'ŭs), mountain ridge of Attica; 4½ m. E. of Athens; 2,680 ft. high—now called Trelo-Vuni. The honey collected here has been famous from remote antiquity for its exquisite flavor; its excellence thought to be due to the fact that it is gathered almost exclusively from the wild thyme with which the mountain is covered.

Hymnol'ogy, the science of hymns, or sacred lyrics. Greek hymns were generally festival songs in honor of gods or heroes, although they were sometimes used, as with us, as an adjunct of very simple religious exercises. Thus, the leaders of the Ten Thousand Greeks, as described by Xenophon, met together, when in straits, prayed to the gods and sang hymns. St. Augustine limited hymns to the expression of praise, but in modern usage they embody various religious feelings or may be even largely narrative, as in hymns like "Once in Royal David's City." Some authorities think that this latitude has been carried too far and tends to obliterate the line between hymns proper and sacred poetry in general.

Of hymns still used in modern worship, the Jewish psalms are the oldest and in many ways the most interesting. With the rise of Christianity, hymns arose in all tongues spoken by Christians. Those composed in Greek and Latin have survived longest. The Reformation seems to have stimulated hymnology in Protestant lands, especially in Germany, which

now claims to possess the finest body of hymns in any language. In general, in modern times, the Teutonic languages have been much more prolific in hymns than the Latin. In Italian, Spanish, and even in French, there is not nearly so much sacred lyric verse as in German, Scandinavian, and English.

The hymnology of English literature scarcely dates beyond the Reformation. It embraced at first only metrical versions of the psalms, Bishop Jeremy Taylor, 1655, being almost the earliest writer of hymns, properly speaking. In the eighteenth century hymn writers multiplied, their efforts being greatly stimulated by the Wesleyan revival, and in the nineteenth century the Established Church awoke to the importance of hymns. At the present time, the hymn may be said to be one of the most popular forms of poetical expression. Religious sentiment, as embodied in it, affects those who would listen neither to exhortation nor to argument; hymns heard in youth may influence the course of a life, and one will often hear them sung by persons who would not be supposed to be subject to religious influences of any kind. The hymns thus popular embrace modern writings, sometimes trivial from the standpoint of literature, and also some of the oldest specimens of hymnology, translations from the old writers, like the Latin "Dies Iræ" and St. Bernard's poem "De Conspectu Cœli," in the form of "Jerusalem the Golden" and kindred fragments.

Among the great writers of early hymns may be mentioned Clement of Alexandria, the earliest known Christian hymnist, and other Greeks, such as Anatolius, John of Damascus, Methodius, and Metrophanes, some of whose hymns, in English translations, are contained in Dr. Neale's "Hymns of the Eastern Church," 1862. Among the Latins, the great name is that of Ambrose (d. 397), who founded a school of hymn writers and wrote lyrics of simple severity. From his time onward the Latin hymns grew more ornate until the Bernards (of Clairvaux and Cluny) sang in glowing strains, which are familiar to us after seven hundred and fifty years. The best-known Protestant German hymn writer is possibly Martin Luther, whose "Ein Feste Burg" ("A Mighty Fortress is our God") is sung in all our churches. Others familiar in translations are Hans Sachs, Stegmann, Paul Gerhardt (1606 76), author of "Jesus, thy Boundless Love to Me," and called the greatest of German hymnists, Newmark, Neander, Bogatsky, Zingendorf ("O Thou, to whose All-searching Sight"), Norvalis, Fouqué, and Lange. Many German hymns were rendered into English by John Wesley.

In English, Isaac Watts is accounted the father of hymnody; the appearance of his "Hymns," 1707 9, and "Psalms," 1719, heralded a new era, and for some time they constituted practically the Protestant sacred poetry of English-speaking lands. Charles Wesley, the poet of the Methodist revival, and the most voluminous English hymn writer, began to publish in 1739, and in the next fifty years filled thirteen volumes with hymns, very many of which are still familiar and popular. Some of the great eighteenth century poets, notably Addison, Pope, Byron, and Cowper, wrote hymns that are still familiar. In the first half of the nineteenth century appeared two classical collections of original hymns—that of Bishop Heber and Keble's "Christian Year." The names of those who wrote acceptable hymns at this time and later, down to the present, are very numerous, and include such familiar ones as Dean Milman, Charlotte Elliott, Horatio Bonar, Faber, Cardinal Newman, Dr. Neale, Dean Alford, Bishops Wordsworth, How, and Bickersteth, F. T. Palgrave, and Miss Havergal. In America the names are fewer, but include, among others, Bishops Cope and Doane, Dr. W. A. Muhlenberg, O. W. Holmes, Francis Scott Key, and such popular writers as Moody and P. P. Bliss, some of whose hymns have been received into the more formal anthologies.

It is surprising what a period of time is covered by hymns now popular and familiar. The Greek hymns known by the first words of their Latin translations "Gloria in Excelsis Deo" ("Glory to God in the Highest") and "Te Deum Laudamus" ("We Praise Thee, O God") are in all liturgies, and the anonymous mediæval Latin "Veni Creator Spiritus" ("Come, Holy Spirit"), "Stabat Mater," and others are as familiar. To select a few others at random, "The Day is Past and Over," is by St. Anatolius, 458 A.D.; "My God, I Love Thee; not because I Hope for Heaven Thereby," is by St. Francis Xavier, 1506; "While Shepherds Watched Their Flocks by Night," is by Nahum Tate, 1652; "Rock of Ages," is by Augustus M. Toplady, 1740; "O Love Divine that Stooped to Share," is by Oliver Wendell Holmes, 1809; "I Need Thee Every Hour," is by Annie S. Hawks, 1835. The music to which the words of hymns are usually set has been composed especially for them only in recent years; the most familiar are fragments or adaptations from various sources, sacred and secular.

Hy'oid Bone, bone comparatively unimportant in man, supporting the tongue and joined to no other bone, but represented either in an osseous condition or by rudimentary cartilages throughout the vertebrata, and of great importance in the lower classes, in which it is of increased complexity.

Hyoscyamus (hī-ō-sī'ă-mŭs). See HENBANE.

Hypatia (hī-pā'shī-ă), daughter of Theon, a Greek of Alexandria, no less renowned for her knowledge of mathematics than of the Neoplatonic philosophy, which she taught with applause in her native city. Her beauty and modesty were also celebrated, but the clergy believed that she made use of her influence with Orestes, Prefect of Alexandria, to the injury of St. Cyril, then the Archbishop of Alexandria. Accordingly, she was set upon by a mob led by priests, who carried her into a church, stripped her of her clothes, and then tore her in pieces, 415 A.D. Theodoret accuses Cyril of instigating this murder, but of his guilt there is no proof.

Hyperæsthesia (hī-pĕr-ēs-thē'sĭ-ā), condition of unusually high sensibility to feeling, especially to pain. It arises in conditions of exalted excitability of the nervous system. It may be general, as in case of fever or nervous irritability; or local, as in the exalted sensitiveness of the skin after a burn, or during inflammation. It is the opposite of anæsthesia.

Hyper'bola, one of the conic sections, produced when the cutting plane makes a smaller angle with the axis of a right cone than is made by the side. The shadow of a globe on a flat wall, when part of the globe is further than the luminous point is from the wall, gives a hyperbola.

Hyper'boloid, surface such that the sections made by passing planes in certain directions are hyperbolas. There are two classes—*elliptical* and *parabolic* hyperboloids. In the former all the plane sections that are not hyperbolas are ellipses, and in the latter all the sections that are not hyperbolas are parabolas. The elliptical hyperboloids are divided into two species—hyperboloids of one nappe and hyperboloids of two nappes. The former are warped surfaces, and the latter are surfaces of double curvature.

Hyperbo'reans, mythical people who dwelt in the far North, beyond the Rhipæan Mountains, where the sun never set, where sickness, old age, and sorrow were unknown. The name was originally applied to the messengers who brought to the shrine of Apollo the gifts of distant peoples.

Hyperi'des, abt. 400–322 B.C.; patriotic Athenian orator; a friend of Demosthenes and a pupil of Plato and Isocrates; began life as a practitioner of law; was faithful to the interests of the people in the contests with Philip, and, 338 B.C., proposed to free all the slaves and enfranchise the resident aliens and the disfranchised Athenians. In 324 he was for a time at variance with Demosthenes, whom he accused of receiving money from Harpalus. He was murdered at Ægina by the emissaries of Antipater. His private character was not above suspicion, but his public acts appear to have been uniformly disinterested and wise. The ancients speak in high terms of the purity and grace of his style, but of his many orations only slight fragments existed up to 1847, when four orations were discovered in Egypt, one of which, "In Defense of Euxenippus," only was entire. This was followed by the find of an important fragment of a funeral oration, 1856. Other speeches and parts of speeches have since come to light, among them the highly characteristic "Speech Against Athenogenes," discovered 1891.

Hype'rion, in Greek mythology, a Titan, the son of Uranus and Gæa, and the husband of Theia, his sister. Hesiod makes him the father of Helius, the sun god, but the name may be a patronymic, and in that case should properly belong to Helius alone, so that the father has assumed the name of the son. The word, regarded as a proper name, means "he who walks on high," a meaning shared also by the patronymic.

Hypersthene (hī'pĕr-sthēn), the Labrador hornblende, or, more strictly, the thin-leaved, brittle, and bronze-colored variety of pyroxene, an impure ferro-silicate of magnesia. It is often quite handsome, and is cut as an ornamental stone.

Hyper'trophy, in pathology, the overgrowth of any part or organ resulting from equal increase of all the constituent parts of that part or organ. It is, as a rule, a desirable process, the part or organ in question increasing in size and therefore in function just as much as is necessary to supply unusual demands made on it. Such is the muscular growth of a blacksmith's arms, or the enlargement of the heart of an athlete. It is not always desirable, however, as the enlarged heart may lead to insufficiency of the valves, and some enlargements, as of the prostate gland, are not only painful but injurious to health.

Hypnotism (hĭp'nō-tĭs'm), general word for the phenomena of hypnosis, a sleeplike condition of body and mind brought on by prolonged concentration of the attention on a single object, usually at the suggestion of a second person. Hypnotism is the scientific word which covers all the facts designated by such terms as *mesmerism, animal magnetism, mental suggestion, clairvoyance, mind reading, second sight,* etc. Two rival theories are held as to the general character of hypnosis. The Paris school, led by Charcot, hold that it is a pathological condition which can be induced only in patients already mentally diseased or having neuropathic tendencies. The Nancy school, led by Bernheim, deny the pathological character of hypnosis altogether, claiming that the hypnotic condition is nothing more than a special form of ordinary sleep brought on artificially by suggestion. All the variations, stages, curious phenomena, etc., of the Paris school, say they can be explained by this "suggestion" hypothesis. The phenomena of hypnotism are explainable as peculiar nervous conditions, and need no occult force to account for them.

The facts on which the current theories of hypnotism are based may be summed up under a few heads. When by any cause the attention is held fixed on an object, say a bright button, for a sufficient time without distraction, the subject begins to lose consciousness in a progressive way. Several mechanical devices have recently been invented to induce a hypnotic state, most of which are designed to fatigue the ocular muscles by means of rapidly revolving disks or points of brilliant light on which the subject fixes his attention.

The Paris school of interpreters find three stages of progress in the hypnotic sleep: First, *catalepsy,* characterized by rigid fixity of the muscles in any position in which the limbs may be put by the experimenter, with great *suggestibility* on the side of consciousness, and anæsthesia in certain areas of the skin and in certain of the special senses; second, *lethargy,* in which consciousness seems to disap-

pear entirely, the subject cannot be aroused by any sense stimulation by eye, ear, skin, etc., and the body is flabby and pliable as in natural sleep; third, *somnambulism*, so called from its analogies to the ordinary sleep-walking condition to which many persons are subject. This last covers the phenomena of ordinary mesmeric exhibitions at which traveling mesmerists "control" persons before audiences and make them obey their commands.

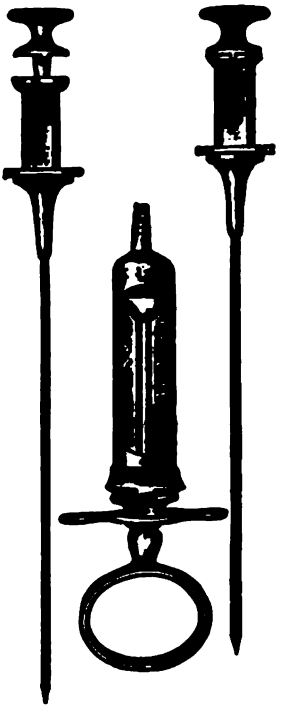
On the mental side the general characteristics of hypnotic somnambulism are: (1) *The impairing of memory* in a peculiar way. In the hypnotic condition all affairs of the ordinary life are forgotten; on the other hand, after waking, the events of the hypnotic condition are forgotten. (2) *Suggestibility* to a remarkable degree. By this is meant the tendency of the subject to have in reality any mental condition which is suggested to him. He is subject to suggestions both on the side of his receptivity to impressions and on the side of action. He will see, hear, remember, believe, refuse to see, hear, etc., anything (with some doubtful exceptions) suggested to him by word or deed, or even by the slightest and perhaps unconscious indications of those about him. (3) So-called *Exaltation* of the mental faculties, especially of the senses, increased acuteness of vision, hearing, touch, memory, and the mental functions generally. By reason of this great "exaltation" hynotized patients get suggestions from experimenters which are not intended, and discover their intentions when every effort is made to conceal them. (4) So-called *Rapport*. This term covers all the facts known before the subject was scientifically investigated, such as "personal magnetism," "will power" over the subject, etc. It is true that one particular operator alone may be able to hypnotize a particular patient, and in this case the patient is, when hypnotized, open to suggestions only from this person. Now, let a patient get the idea that only one man can hypnotize him, and that is the beginning of the hypnotic suggestion itself. It is a part of the suggestion that a certain personal *rapport* is necessary. *Rapport* and all the amazing claims of charlatans to powers of charming, stealing another's personality, controlling his will at a distance, are explained, as far as they have anything to rest on, by suggestion under conditions of mental hyperæsthesia or exaltation.

In a number of city hospitals patients of recognized classes are at once hypnotized and suggestions of cure made. Liébault, the founder of the Nancy school, has the credit of having first made use of hypnosis as a remedial agent. Hysteria and allied nervous disorders are especially amenable to hypnotic treatment. It is also becoming more and more recognized as a method of controlling refractory and violent patients in asylums and reformatory institutions. It must be added, however, that in general psychological theory rather than medical practice is seriously concerning itself with this subject. The facts show an intimacy of interaction between mind and body to which current psychology in its psycho-physical theories is beginning to do justice. See CHRISTIAN SCIENCE; PSYCHOTHERAPY.

Hypochondriasis (hīp-ō-kŏn-drī'ă-sĭs), morbid state of mind, deriving its name from the old belief that the hypochondria, or regions of the abdomen on either side of the epigastrium, were the seat of the disease. It is more common in men than in women. The patient imagines that he suffers from diseases which he does not possess, and in which he suffers from subjective sensations entirely unaccounted for by the objective signs of disease in his case. The disease itself is real. It may result from dyspepsia, bad habits, or other causes interfering with the nutrition of the nerve centers.

Hypocy'cloid, curve whose course is generated by a point in the circumference of a circle rolling on a concave side of a fixed circle. When the rolling circle has a radius equal to just half that of the fixed circle, one revolution of the smaller circle will generate a hypocycloid equal to the diameter of the greater circle. If the rolling circle is the larger, the hypocycloid becomes equivalent to an epicycloid. If the generating point of a hypocycloid be in the plane of the rolling circle, but not in its circumference, the curve generated is a hypotrochoid; and if the radius of the fixed circle is double that of the rolling one, the hypotrochoid becomes an ellipse.

Hypoder'mic Medica'tion, the giving of drugs by the use of a hollow needle attached to a syringe. This was first brought into practical use by Dr. Alexander Wood, of Edinburgh, who in 1843 injected a solution of morphine through an opening made in the skin. For the carrying out of hypodermic medication it is necessary to have a small hollow needle made from a metal which will give it considerable strength, and a syringe which should hold from 20 to 30 minims of water. The medicament having been drawn into the syringe and all the air driven out, the needle is attached and then its point is introduced beneath the skin in such a way that when the fluid is discharged it will find a resting place in the loose connective tissue, and not immediately beneath the skin where it would separate the derm from its nourishing blood vessels.



HYPODERMIC SYRINGE WITH TWO NEEDLES.

The injection should be slowly made, but the insertion of the needle should be done rapidly, as it is less painful. The injection is generally given in the arm or on the thigh, care being taken to avoid veins, since should the drug enter a vein it might be carried directly to the heart, and exert too great an influence. Care must be taken that the needles and syringes are absolutely aseptic, and if this detail be attended to there is usually no danger of abscess. The dose for hypodermic medication is about one quarter to one half that generally used by the mouth, and the advantage of this method is the rapid absorption of the drug in cases where an immediate effect is desirable, even while the patient is unconscious.

Hyp'ogene, term in geology, proposed by Lyell to designate rocks that are nether-formed, or formed at great depths, and consequently underlie sedimentary and ejected volcanic rocks, which are of superficial origin. Granite, gneiss, and diorite are examples of hypogene rocks.

Hypophosphites (hī-pō-fŏs'fīts), salts of hypophosphorous acid. In medicine the term is currently used as referring to potassium, sodium, and calcium hypophosphite, which are considered by some to yield the medicinal effects of phosphorus, while free from the latter's poisonous qualities. They were not long since highly vaunted as remedies in the treatment of consumption, but have not sustained their reputation in that particular.

Hypotheca'tion, in the civil law, a kind of pledge in which the possession of the thing pledged remained with the debtor instead of being delivered to the creditor or lender, as in case of pledge properly so called. Strictly speaking, it applies to immovable things, not susceptible of delivery from hand to hand. The term is but little used at common law, but is sometimes employed with reference to bottomry bonds, which are given to obtain a loan of money by making a vessel security for the repayment.

Hypoth'esis, judgment which is provisionally proposed as an explanation for some fact or group of facts in science. When an examination of a sufficient number of the facts of the case shows that the hypothesis will stand the tests of experience, and is not inconsistent with known facts and principles, it becomes a *theory*. The *hypothesis* is the work of imagination, the *theory* the fruit of observation and reasoning.

Hypsom'etry, that branch of geodesy which treats of the measurement of heights, either absolute, when referring to the sea level, or relative, between any two distant places on the earth's surface. There are three principal and independent methods in use. The first and most accurate depends on the property of fluids when at rest to present their surfaces at right angles to the direction of gravity; the second depends on the angular measure of elevation, in combination with the known distance of the object, and having regard to the effect of atmospheric refraction; the third and least accurate method depends on the law of the decrease of pressure of the atmosphere with an increase of altitude. The first method employs the leveling instrument, the second the theodolite, the third the barometer.

Hy'rax, small pachyderm, coming nearest to the rhinoceros family, but looking much like a diminutive hare, and in some respects seeming to form one of the connecting links with the rodents. The Syrian hyrax is about 11 in. long and 10 in. high; the upper parts are brownish gray, the sides yellowish, and the lower parts white; movements quick, and hab-

CAPE HYRAX.

its much like those of rodents; sense of smell acute, of mild disposition, with little intelligence and little fear; found on the mountains near the Red Sea, and in Abyssinia. This animal, according to Bruce, is called in Arabia and Syria Israel's sheep, and is the *shaphan* of the Hebrews, generally translated rabbit or cony. The Cape hyrax is about the size of the rabbit, but with shorter legs; the color is uniform grayish brown, darkest along the back; it lives in the rocky regions of S. Africa; its flesh is delicate and savory.

Hyrcania (hĕr-kā'nĕ-ā), ancient district of Asia, the present Djordjan; was bounded N. by the Caspian Sea, E. and S. by Parthia, and W. by Media; was inhabited by nomads of rude and savage habits, and its extensive forests swarmed with wild beasts, of which the Hyrcanian tiger is often mentioned.

Hyrcanus (hĕr-kā'nŭs), name of two Maccabean princes of Judea, who follow: HYRCANUS I, JOHN, d. 105 B.C.; high priest; succeeded his father Simon Maccabæus in the high priesthood as one of the Asmonean rulers of Judea, 135 B.C.; was at first compelled to pay tribute to Antiochus Sidetes, after whose defeat and death, 130, he reëstablished his independence, razed Samaria, took several other cities from Syria, conquered the Idumeans, and formed an alliance with the Romans; was succeeded by his son Aristobulus, who took the title of King of Judea.

HYRCANUS II, JOHN, d. 30 B.C.; high priest; eldest son of Alexander Jannæus and his wife Alexandra, daughter of John Hyrcanus. On his mother's death, 71, he succeeded to the kingdom, but the power was soon wrested from him by his younger brother Aristobulus. Pompey reinstated him as a tributary prince, 63. Dissensions again deprived him of power, but Cæsar restored him as high priest, Antipater

having civil authority as procurator. Antigonus, son of Aristobulus, aided by the Parthians, took him prisoner; his ears were cut off to render him incapable of being high priest, and he was banished to Babylonia. After some years he was persuaded to return to Jerusalem, where King Herod, Antipater's son, caused him to be put to death.

Hyrtl (hĕrtl), **Joseph von**, 1811–94; Hungarian anatomist; b. Eisenstadt; Prof. of Anatomy at Prague, 1837–45; at Vienna, 1845–74; founded the Vienna Museum of Comparative Anatomy; made important investigations on the organ of hearing, invented many anatomical instruments; and, among other works, published "Lehrbuch der Anatomie," which became a text-book in many languages.

Hys'iæ, town of Bœotia, at the N. foot of Mt. Cithæron; was on the high road from Thebes to Athens, and formed an important point in the strategic disposition to the battle of Platæa. In the time of Pausanias it was in ruins. Another place of the same name was on the S. frontier of Argolis, where the Spartans were defeated by the Argives, 669 B.C., when it still remained in the possession of Argos.

Hys'sop, half-shrubby labiate plant, a native of Europe, sparingly naturalized in the U. S. It is an aromatic stimulant, abounding in a volatile oil. In domestic medicine it is a very useful expectorant. Hedge hyssop is the popular name of various species of *Gratiola*, of the family *Scrophulariaceæ*. The hyssop of Scripture has been identified with the modern caper plant, which is still found in abundance in Egypt, Sinai, and Palestine.

Hystaspes (hĭs-tăs'pēz), author of a prophetico-apocalyptic work, "Vaticinia Hystaspis," which was much read by the early Christians, and believed to contain predictions of Christ and the future of his kingdom. Of his life nothing is known, and the book itself has vanished; but it is often mentioned by the early Christian Fathers. Clement of Alexandria says of it that "the Christians found in it, even more plainly than in the books of the Sibyllines, references to Christ and the future of his kingdom, and especially a reference to Christ's divine Sonship, to the sufferings which awaited him and his followers, and to his final return."

Hyste'ria, or **Hyster'ics**, disease characterized by great excitability of the nervous system, especially of the sensory ganglia, without necessary structural lesion. It may be inherited, or may be caused by bad habits, hard work with excessive worry, etc. In the beginning it generally manifests itself by an exaggeration of the ordinary signs of emotional excitement, such as smiles and tears, irrepressible laughter and convulsive sobs, brought on by trifling causes; the nervous excitability increases, until violent convulsions arise from slight stimuli, with an arching of the whole body, paralysis, cramps, ending often in monomania or moral insanity. An attack of hysteria may last for several hours, the violent symptoms recurring every few minutes, with intervals of partial rest; or it may consist of but a single paroxysm of twenty minutes or half an hour in duration. After the paroxysm has ceased, tolerable health may be enjoyed for some time, though the nervous excitability persists. Hysteria received its name from the idea that it is peculiar to the female sex, originating in disturbance of the uterine functions; but, though much more common in females, and generally connected with disorders peculiar to the female, it also occurs in males. The disease is most frequent and most violent among the Latin races. Savages are exempt, and dwellers in towns are much more liable than the agricultural class.

Sedatives may be given about the time of the attacks, but restraint is not often necessary, for the patient does not carry out her threat to harm herself, and in falling usually chooses a soft place. A cure is best obtained by healthy employment of mind and body, avoiding worry and the maudlin sympathy of relatives and fellow hysterics. The hysterical attitude of mind is best prevented by healthy living and rational training, and by curbing the morbid regard of self which leads to excessive emotional outbursts. A grave form of hysteria, resembling in some symptoms the more serious malady epilepsy, was described by Charcot, of Paris, who named it hysteroepilepsy.

I

I, the ninth letter of the Roman alphabet; once interchangeable with J, which is a form of the same letter, although at present of very different power. I is a vowel, and in English has three well-marked sounds: (1) The sound of long *e*, as in *machine*, *marine*; this is the sound almost invariably given to it in all other languages which have this letter; (2) the "long sound," that heard in *mind*, *sign*; this sound is strictly a diphthong between *a* broad and long *e*; and (3) the "short" sound, heard in *pin*, *minion*. As a numeral, I stands for *one* (1); in chemistry it is the symbol of iodine; in astronomy, it is equivalent to inclination. See ABBREVIATIONS.

Iaba'dius, name under which Ptolemy described a vast island of the E. Indies, near the Golden Chersonesus. It was fertile in grain and produced gold; the capital was called Argyre. From the similarity of names, both of which mean "barley," it is generally thought to be identical with *Java*, though Humboldt argues for Sumatra.

Iacchus (ī-ăk'kŭs), in Greek mythology, one of the chief gods of the Eleusinian mysteries. The myth-making fancy never painted him in fixed outlines with a definite character. We hear of him as the son of Demeter, the son of Persephone, the husband of Demeter, the son of Dionysus, and as the equal of Dionysus, from whom he was expressly distinguished, though some regarded him as identical. The story of Iacchus is the story of the Eleusinian Mysteries.

Ial'ysus, colony of the Phœnicians in the island of Rhodes; was conquered by Dorians abt. 1100 B.C.; and was very flourishing in the time of the Homeric poems. It was a member of the Dorian Hexapolis, and being the chief city in the island, was regarded by Pliny as a synonym of the island itself. Some traces of the ancient greatness of Ialysus are still seen at the modern village of Ialiso.

Iam'bic, poetic meter much used in Greek, Latin, and modern verse, consisting of a succession of *iambi*. An iambic foot is formed either of one short and one long syllable, as in *ămāns*, or of an unaccented syllable followed by one accented, as in *ĕstēēm*.

Iamblichus (ē-ăm'blĭ-kŭs), d. abt. 330; Neoplatonic philosopher of the fourth century after Christ. He was a disciple of Porphyry, and resided in Cœle-Syria. He assumes an absolutely first One above the One of Plotinus, a first principle utterly ineffable and unknowable, like the Brahm of the E. Indians. Five books of his work on Pythagoras, and his (reputed) book on the Egyptian theology, together with four treatises on arithmetic and philosophy, are extant.

Ianthina (ī-ăn'thĭ-nā), genus of mollusks including the ocean snails or violet snails. They have a snaillike shell, and float on the open sea, supported by a cartilaginous raft, containing air vesicles. They have no power of rising or sinking in the water. There are six known species.

Iap'etus, in Greek mythology, a son of Uranus and Ge, brother of Cronus and Oceanus, and father of Atlas, Menœtius, Prometheus, and Epimetheus. He was regarded by the Greeks as father of all the human race, and the name is supposed to be the same as the Japheth of Genesis.

Ibadan (ē-bä'dän), town of W. Africa; in the Yoruba country; in the valley of the Onay River; is inclosed by a mud wall 18 m. in circuit; principal occupation of the inhabitants is agriculture. Pop. (1907) 200,000.

Ibea (ī-bē'ä), name applied to British E. Africa, abt. 1890, by the Imperial British E. Africa Company, and made from its initials. The name was discarded when Great Britain took the territory out of the company's hand, 1895, and has disappeared from most maps.

Ibe'ria, one of the names under which Spain was known to the ancients. It was chiefly used by the Greeks, and probably was derived from *Iberus*, the Ebro.

Iberville (ē-bĕr-vēl'), **Pierre Lemoine d',** 1661–1706; French-Canadian military and naval officer; b. Montreal; brother of the Sieur de Bienville and of five other able public men; captured Fort Nelson, 1686; served in the Schenectady affair, 1690; in 1696 destroyed St. Johns, and took nearly all of Newfoundland from the British, whom he defeated in Hudson Bay in the naval fights of 1697. In 1699 he fortified Biloxi; 1700, ascended the Mississippi River; 1702, fortified Dauphin Island and founded a settlement near Mobile; 1706, with three ships, attacked and captured the Isle of Nevis.

I'bex. See BOUQUETIN.

I'bis, generic name of several wading birds of the family *Ibididæ*, used as a common name for the various members of the group. The ibises are good-sized birds, with long, curved, blunt bills, grooved along the side; curved wings long and rounded. The most famous is the sacred ibis, a bird about 28 in. long, white,

SACRED IBIS.

with bare black neck, and long, loose, purplish black tertials which cover the tail like the plumes of an egret. The sacred ibis is now extremely rare in Egypt. The scarlet ibis of N. S. America is suspected to be a variety of the white ibis of the S. U. S. The glossy ibis, whose general color is purplish chestnut, is common to the Old and New Worlds. The wood ibis is now placed with the storks, but the popular name still clings to it.

Ibrahim Pasha (Ib-rä-hēm' pä-shä'), 1789–1848; Egyptian viceroy; b. Kavala; son of Mehemet Ali. His youth, from his sixteenth year, was spent in command of troops in Upper Egypt. In 1816 he invaded Arabia, where he captured many strongholds, and finally the Wahabee capital. He returned to Cairo, 1819, and created an army disciplined after the European model. In 1824, in aid of the sultan, he set sail with a formidable fleet and 17,000 troops for Greece, and devastated the Morea. His fleet was destroyed at Navarino, October

20, 1827, by the combined squadrons of England, France, and Russia; and, 1828, he was recalled to Egypt. In 1831, his father having revolted, he invaded Syria, laid siege to Acre, routed a Turkish army sent to its relief, and carried it by storm. He won other victories at Homs, Hamah, Aleppo, Adana, Ulu Kislak, and Konieh, where he routed 60,000 Turks with half that force, and captured the grand vizier with immense booty.

He would have marched on Constantinople, but his father's commands obliged him to wait for reënforcements, thus giving the sultan time to procure aid. The European powers interfered, and a peace was concluded, leaving to Mehemet Ali the government of Syria and the pashalic of Adana. In 1839 Mehemet Ali again revolted, and another crushing defeat was inflicted by Ibrahim on the Turkish forces, at Nizib; but Turkey was again saved by the interposition of the other powers, and Mehemet Ali was ordered to withdraw his forces from Syria. Thereafter Ibrahim devoted his time to the culture of his estates on the plain of Heliopolis, until he was placed in charge of the government on the retirement of his father, 1844.

Ib'sen, Henrik, 1828–1906; Norwegian dramatist; b. Skien; was at first apprenticed to a druggist, but soon abandoned that business in order to devote himself to literature; was appointed director of the newly erected Norwegian theater in Bergen, 1854, and, 1857, took charge of the theater in Christiania; 1866, he obtained a pension from the Norwegian Storthing, and from that time up to 1891 he resided abroad; after that date lived in Christiania. His first drama, "Catilina," 1850, a tragedy, was, on the whole, not a success. After this attempt at dramatic production, he turned to Norwegian historical subjects, treating them in a romantic manner. "The Comedy of Love," a stinging satire of everyday love, was followed by "Brand" and "Peer Gynt," both satirical dramas in verse, which have attained an immense popularity in the Scandinavian countries. With "The Pillars of Society," Ibsen began that series of realistic pictures of everyday life that made him famous as a dramatist of the first order all the world over. The dramas of this kind include "A Doll's House," "Ghosts," "An Enemy of the People," "The Wild Duck," "Rosmersholm," "The Lady from the Sea," "Hedda Gabler," "The Master Builder."

Ibycus (Ib'I-kŭs), lived in the sixth century; Greek lyric poet; b. Rhegium; resided for some time in Samos at the court of Polycrates. Known to all, chiefly through the poem of Schiller, "The Cranes of Ibycus," is the story of his end. Ibycus was a wandering bard, and, while traveling through a desert place near Corinth, was attacked by robbers and mortally wounded, but before dying called on a flock of cranes flying over him to avenge his death. Shortly after it happened at Corinth that a flock of cranes flew over the theater while a performance was going on, and one of the murderers cried out involuntarily, "Behold the avengers of Ibycus!" which led to the discovery and punishment of the crime.

Içá (ē'sä), called by Brazilians the PUTUMAYO of Spanish Americans; a river of S. America, rising near Pasto, Colombia, flowing SE. to its confluence with the Sacanhi, and thence E. to the Amazon; length along the main curves over 1,000 m. Steamers drawing 6 ft. of water have ascended it to Cuemby, hardly 100 m. from the head. It receives over thirty affluents, some of them navigable.

Ica (ē'kä), capital of the Peruvian department of the same name; formerly known as HUANANICA; on the Ica River; 1,575 ft. above the sea; is connected by a railway with the port of Pisco, 46 m. distant, and is noted for its wines and brandy. The city was founded 1563, and has been several times partially destroyed by earthquakes. Pop. abt. 9,000.

Ica'ria, or Ic'arus (*Nikaria*), island of the Ægean Sea; W. of Samos about 15 m. long from NE. to SW., and rather narrow; area, 50 sq. m. Its population of abt. 10,000 support themselves chiefly by the sale of charcoal and firewood. The island belongs to Turkey.

Ica'rius, in Greek mythology, a resident of Attica in the reign of Pandion. Dionysus, newly come to Greece, visited him, was hospitably entertained, and on leaving instructed Icarius in the art of wine culture. The shepherds of the neighborhood drank of the unmixed wine freely, became drunk, and imagined that they had been poisoned. Thereupon they killed Icarius, but when, on the next day, they found that they had not been poisoned they repented and buried him with honor. Erigone, his daughter, sought for him everywhere in vain, until his dog Maira found his grave. Erigone hung herself in despair, and both she and the dog were transported to the starry firmament because of their faithfulness. Erigone is to this day the Virgo in the zodiac, and the dog is the smaller Procyon, not far from Orion.

Ic'arus, in Greek mythology, the son of Dædalus. He forgot, according to the old myth, his father's advice on their flight from Crete, and flew so high that the sun melted the wax with which the wings were attached to his shoulders, and he fell down and was drowned in the sea, near the island of Doliche on the coast of Asia Minor. After him the island was thenceforth called Icaria or Icarus, and the sea also was known as the Icarian.

Ice, water solidified by freezing. At 32° F. under ordinary circumstances water begins to crystallize. Slender prisms, usually of six sides, and terminated by six-sided pyramids, form in it, and arrange themselves in lines crossing each other at angles of 60° and 120°. The presence of salts in solution impedes this process, and when at last it takes place at a temperature below 32°, the greater portion of the foreign matter is excluded from the ice, which consequently is nearer the composition of pure water. Pure water contained in a polished vessel and kept perfectly quiet may be

reduced to several degrees below the freezing point without freezing; but agitation or the introduction of foreign bodies will cause congelation to take place suddenly, and as the ice is formed latent heat is liberated, and the temperature rises to 32°. From about 39° water expands as its temperature is reduced, with the exertion of prodigious force. A hollow globe of brass with a cavity only an inch in diameter, filled with water, has been burst by the freezing of this, exerting a force, as estimated, of 27,720 lbs. This expansion, estimated by

Ice Crystals.

Boyle at one ninth the original volume, gives to ice less density than that of water, so that it floats.

Although the act of freezing expels from the crystallized mass the salt and other mineral ingredients, leaving it when in a frozen state very nearly pure fresh water, yet ice formed from or floating in salt water gathers in the interstices between the crystals so much salt, brackish, or impure water that it becomes unfit for household purposes. Hence the ice crop is gathered from fresh-water ponds or lakes, or from rivers above tide water. The methods of gathering and storing ice are entirely American. When it has reached a proper thickness, the surface is cleared with wooden scrapers drawn by horses, and the upper porous layer cut away with steel scrapers. The ice is then grooved into large squares by implements resembling plows and harrows; the blocks are broken apart with saws, and hoisted into ice houses on the shore, often by steam power. The houses are large wooden buildings without windows, filled with sawdust, shavings, or spent tan bark, between the outer and inner walls, sometimes capable of holding from 20,000 to 50,000 tons. In the U. S., as elsewhere, the constantly increasing demand for ice and the irregularity of the crops have led to the establishment of factories for the making of ice by chemical processes.

Refrigerating cars convey to E. markets in the U. S. beef from Chicago, and ripe fruits, game, and other articles from San Francisco, which it would otherwise be impossible to obtain in the E. markets, and return with oysters and other shellfish, condensed milk, butter, and other articles from the Atlantic coast. Steamers fitted up with refrigerating chambers take to N. ports beef and mutton from Texas, oranges, lemons, bananas, and guavas from the W. Indies, S. American fruits from Brazil, and return with milk, butter, oysters, apples, peaches, pears, and other products not obtainable otherwise in tropical climates, and ocean steamships carry fresh meat, dressed in the U. S. to the great food-distributing ports of Europe. Cold storage houses in many cities of the U. S. preserve, with a slight percentage of loss, oranges, lemons, grapes, apples, pears, peaches, etc., from one to three years.

Ice, Artificial, ice produced by mechanical or chemical means. Ice making has become in comparatively recent years one of the great industries of the U. S. It is an inestimable boon in places where natural ice does not form and where its use is restricted by long shipments, and a vast commercial consideration in more favored localities, where the supply of natural ice, even in more productive seasons, falls far below the demand. Commercial artificial ice is produced by two systems, known as the *can system* and the *plate system*. In the can system the water to be frozen is placed in cans, and immersed in a tank of cold brine. The ice produced in this way is in small cakes, not greater than 300 lbs. each. With a temperature of brine of from 16° to 18° F., the time required to freeze a cake is about sixty hours. In the plate system the ice is formed on the sides of cooled surfaces in from nine to fourteen days to a thickness of about 14 in. The cooling surfaces are hollow plates 10 by 14 ft. in area, in which the cooling fluid circulates. In the can system distilled water is used for freezing; in the plate system the water is not distilled. With the can system distilled water produces a clear and transparent ice, whereas, if the water is not distilled, the ice will be opaque, and, in most cases, of a brownish color. In the plate system a clear ice is made without distilling the water.

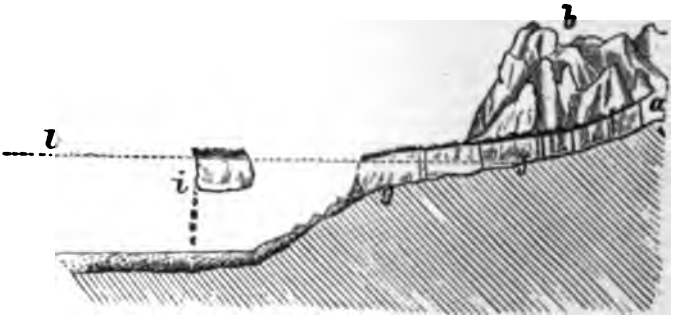
The cooling is usually accomplished by employing a volatile liquid, such as ammonia, sulphur dioxide, or ether, which on being evaporated absorbs heat. The liquid most commonly employed is ammonia, which at atmospheric pressure boils at a temperature of —27° F. If this ammonia is introduced in a coil submerged in a brine tank the heat of the brine will boil the ammonia, and the brine will be cooled and may be used for either refrigerating or ice-making purposes.

After the ammonia has evaporated and performed its work of cooling it is at a low pressure. To convert the vapor to a liquid state it must be raised to a high pressure. Thus if am-

monia be condensed at a temperature of 80° F., the pressure is 140 lbs. per square inch above the atmosphere, and if evaporated in the cooling coils at 5° F. the pressure is 19 lbs. per square inch above the atmosphere. To raise the pressure from 19 to 140 lbs. two methods may be employed—a compressor driven by an engine may be used, or the vapor may be absorbed in cold water and the aqueous ammonia introduced into a still, where it is heated and the gas is driven off at the high pressure. After the vapor is raised from the lower to the higher pressure it is passed into a condenser, where heat is abstracted and it is reduced to a liquid state. It is then used over again in the cooling coils.

The distilled water from which ice is made is furnished by condensing the exhaust steam from the refrigerating machine, and by condensing live steam. In a large economical plant the steam required to run the plant is less than the amount of ice that can be produced, provided the water that is frozen is not distilled. If the water is distilled the weight of ice made per pound of coal is limited by the evaporation of the boilers, because the ice made cannot be greater than the steam produced, less the amount lost by drip from the steam pipes and through other causes. It is possible, therefore, to make more ice per pound of coal by the plate method where the water is not distilled than it is by the can system as ordinarily operated. See FREEZING; REFRIGERATION.

Ice'berg, large, floating mass of ice. The term is practically restricted to fragments detached from glaciers. When a glacier descends to the level of the sea, portions of its mass break away and float on the water. By favorable currents they are often carried to great distances before completely melting. With them is carried whatever glacial detritus they originally contained, and this falls to the bottom as they melt. It is believed that the Banks of Newfoundland, lying where the ice-laden Labrador current meets with the warm Gulf Stream, receive in this way important deposits of earth and rock derived from Greenland and other N. lands. An iceberg floats with about one eighth of its mass above the water, and its summit sometimes rises to a height of 200 or 300 ft. The greatest bergs are seen in the S. Ocean and are tabular in form, with a height above the sea of 150 to 200 ft. See GLACIERS.



FORMATION OF ICEBERG.
a. g. Glacier. *b.* Cliffs beyond. *l. l.* Sea level. *i.* An iceberg.

Ice'land, part of the Danish kingdom, enjoying home rule; with the exception of Great Britain, the largest island in the N. Atlantic; extending from 63° 24′ to 66° 33′ N. lat., and from 13° 22′ to 24° 35′ W. of Greenwich. Situated 600 m. W. of Norway, but only 250 m. E. of Greenland, it belongs geographically to the W. hemisphere, while in history and politics it belongs to Europe. Its area is 39,756 sq. m. Pop. (1901) 78,470; capital, Reykjavik. With the exception of the S, which swells out into a broad arch, the whole coast is high and precipitous, not unlike that of Norway. The interior is a high table-land, with an average elevation of about 2,000 ft., while there are snow-capped mountains that attain an altitude of nearly 5,000 ft. above the sea level; indeed one, Oræfa Jökull, is more than 6,000 ft. in height. The island has several active volcanoes, among which Mt. Hecla and Mt. Katla are the most important. There are numerous and extensive ice fields or ice hills called jokuls, the largest one being the Vatnajokul, in the SE., covering about 4,000 sq. m. The summers are cool, and the winters, considering the latitude, are mild. The Gulf Stream bathes the S., E., and W. shores, while a polar current flowing toward Greenland frequently fills the N. fjords with ice.

Of the population 65,000 are farmers, or rather stock growers, raising sheep, cattle, and horses. The fisheries employ about 7,000 men. The principal minerals are sulphur, lignite, and Icelandic spar. The summers are too short for the growth of cereals. The only trees found are the dwarf birch, small willows, and here and there a stunted mountain ash. Garden vegetables, such as potatoes, turnips, carrots, and cabbages, are cultivated with considerable success. The only mammal peculiar to Iceland is the snow mouse, while the only wild animal found there is the fox. The domestic animals are the cow, the horse, the sheep, the dog, and the cat. The rivers abound in salmon and trout, and the sea around the coast contains cod, haddock, halibut, seals, and whales. Fish, wool, tallow, fish oil, and live horses are the chief articles of export.

The Icelanders belong exclusively to the Scandinavian branch of the Teutonic race, and their religion is the Evangelical Lutheran. There are in Reykjavik a theological seminary, a medical college, a nautical academy, a gymnasium, and an elementary school. A few primary schools have been established in the various trading and fishing stations. There is a flourishing academy in Modruvellir, an agri-

cultural college at Olafsfjord, and the island supports four seminaries for young women. With Old Norwegian and the modern popular dialects of Norway the Icelandic language forms the minor branch, W. Norse, as distinguished from E. Norse, which includes Danish and Swedish.

Icelandic literature may be divided into a prose and a poetic literature. The former is chiefly represented by the Sagas and the *laws*, the latter by the mythical and heroic, *eddic* poetry, and the artificial, *scaldic* poetry.

Iceland is believed by many to be the Thule referred to by Pytheas, 340 B.C., by Strabo, Mela, Pliny, and Ptolemy. Its settlement began, 874, when Ingolf built his house on the present site of Reykjavik, two years after the Hafersfjord battle, by which all Norway became subject to King Harold Fairhair. In 930 a political organization was effected which resulted in the adoption of the Ulfljot constitution, an adaptation of the law of the Gula-moot in Norway. By this constitution an Icelandic republic was established which flourished for more than three hundred years. The latter days of the republic developed a series of jealousies and internecine feuds. The warring Icelanders fell into the habit of appealing to the kings of Norway as arbitrators, and thus the way was paved for making Iceland a dependency of Norway, which took place quarter by quarter, 1262–64. In 1380, in connection with Norway, Iceland became united with Denmark, and remained with the latter country after the union of Norway with Sweden, 1814. Complete home rule was granted by Denmark, 1874, in connection with the celebration of the one thousandth anniversary of the colonization of the island. The new constitution makes the king govern Iceland through a member of his cabinet, who is responsible to the Icelandic Althing, and through the governor appointed by the king and residing at Reykjavik as chief executive officer. The new Althing consists of two chambers, with full legislative powers, and is composed of six crown nominees and thirty members chosen by the people, who enjoy almost universal suffrage.

ICELAND MOSS, NATURAL SIZE.

Iceland Moss, lichen (*Cetraria islandica*) which grows abundantly in the colder portions of America and the Old World. It is a common constituent of medicines used in pulmonary complaints, and supplies a nutritious food to the Eskimo and other natives of high latitudes.

Iceland Spar, transparent calc-spar, of which the best specimens are obtained from Iceland. It displays in great perfection the phenomena of double refraction.

Ice Plant, herb of S. Europe and N. and W. Africa, the *Mesembryanthemum crystallinum*, of the family *Ficoideæ*. Its succulent leaves are covered with small bladderlike cavities which appear like crystals of ice. It is often seen in house culture, and has demulcent, diuretic, and expectorant properties.

Ichang (ē-chāng′), city, province of Hupeh, China; on the Yangtze, 1,100 m. from its mouth, and 15 E. of the Yangtze gorges. From its position at the outlet of these gorges the city has always been an important shipping point, most cargoes being transshipped here to other junks specially fitted for the voyage up or down. Ichang stands on the edge of one of the richest coal fields in the world, that of Szechwan. Pop. (1907) 55,000.

Ichneumon (ĭk-nū′mŏn), name in its largest sense applicable to the numerous genera of small quadrupeds of the family *Viverridæ*, subfamily *Herpestinæ*—all Old World carnivorous mammals of active habits and fierce disposition, preying upon serpents, birds, and small game of many kinds. Strictly the name designates the *Herpestes ichneumon* of Egypt; famous as the devourer of the eggs of the crocodile and as a destroyer of venomous serpents; hence it was worshiped by the ancient Egyptians. Spain has an ichneumon, *H. widdringtonii*.

EGYPTIAN ICHNEUMON.

ICHNEUMON FLY.

Ichneumon Fly, one of a great family (*Ichneumonidæ*) of hymenopterous insects which

are of the greatest service to the agriculturist and to mankind, since they deposit their eggs either on or within the eggs or larvæ of larger insects and spiders, the future larva of the fly devouring the insect on which it is hatched. Immense numbers of noxious insects are thus destroyed. There are about 5,000 known species.

Ichnol'ogy, science of tracks, a name proposed by Dr. Buckland. The animals whose existence is made known by their markings on stone may be called *Ichnozoa*. Sixteen permanent characters in markings serve to distinguish satisfactorily different classes of animals. The following are examples of characters: tracks of feet; trails made by the body or its caudal extremity drawn along in the mud; width of the trackway; relative size of hind and front feet; length of step; number of toes; mode of progression; spread of the toes; formation of the heel and of the claws.

Ichthyology (Ik'thĭ-ŏl'ŏ-jĭ), that branch of zoölogy which treats of the vertebrated animals formerly collectively known under the name of fishes (*q.v.*), but which are now distributed among several classes, orders, and subordinate divisions. There have been numerous classifications since the middle of the sixteenth century; when Belon, Roudelot, and Salviani laid the foundations of modern ichthyology, each succeeding one showing a marked advance in the knowledge of the structural arrangement of the different species. Hence, the classification of to-day is liable to modification to-morrow. As an evidence of the difficulties under which the best ichthyologists of the world have labored in an effort to arrange a classification that would meet with general acceptance, attention is called to the "Catalogue of the Fishes in the British Museum," compiled by Prof. Albert Günther, 1859–70.

In this monumental work all the species recognized by the author, as well from autopsy as descriptions of species unknown to him, were described. The author adopted 6,843 species as established, while 1,682 others are considered as doubtful, and referred to by name only in footnotes to the genera to which they are supposed to belong. It is assumed that about 1,000, however, of the doubtful species will be ultimately confirmed, and, allowing 2,000 species to have been described during the course of publication of the series, it is estimated that we may put the total number of fishes known at present as about 10,000. The bibliography of the science is very large, and, besides the most important species noted in this work, the reader is referred to the standard and government publications.

Ichthyor'nis, extinct genus of birds described by Prof. O. C. Marsh from the Cretaceous of Kansas. They possessed teeth and biconcave vertebræ, from which fishlike character the name is derived.

Ichthyosaurus (Ik-thĭ-ŏ-sŏr'ŭs), gigantic fossil marine reptile. The best known species, *Ichthyosaurus communis*, grew to a length of 20 ft.; the large conical, longitudinally furrowed teeth are from 40 to 50 above on each side, and 25 to 30 below; the jaws are prolonged and compressed, the vertebræ about 140, with the anterior paddles three times as large as the posterior. These reptiles, of gigantic

SKELETON OF THE ICHTHYOSAURUS.

size and marine habits, must have been very active and destructive; their food, as indicated by the bones and scales found with their remains, consisted principally of fishes. From the great size of the eyes, they could probably see well by night; being air breathers, like the crocodiles, they no doubt seized their prey near the surface; the immense cuttle fishes of the secondary epoch probably furnished a portion of their food.

Ico'nium, now KONIA or KONIEH, important place in the time of the apostles; in Asia Minor, on the highway between W. Asia Minor and Syria. An oasis in a desert, it was called the Damascus of Lycaonia. From 1099 to 1293 it was the capital of the Seldjouk Empire of Roum. Captured by Frederick Barbarossa, 1189, it was recovered by the Seldjouk Turks, 1190. The city is surrounded by walls nearly 3 m. in length, strengthened by 108 strong towers, and formerly defended by a ditch. The suburbs are extensive and populous. It contains the tomb of Hazret Mevlaneh, founder of the Mevlevi dervishes, whose successor outranks all the other dervishes of the Ottoman Empire, and has the privilege of conferring investiture on each new sultan, and girding on him the sword of Osman. Pop. (1908) 60,000.

Iconol'atry, in ecclesiastical history, the veneration of images. It is a matter of dispute when images were first introduced by Christians into public worship. The prevailing opinion is that they passed from the family into the temple at the end of the third century, and that their public use became general at the close of the fourth. In Egypt and throughout Africa the use of images met with little favor; but it became interwoven with the whole domestic and public life of the Greek and Asiatic Christians. In the course of the sixth century it became a custom in the Greek Church to make prostrations before images as a token of reverence to the persons whom they represented. The Manichæans had already characterized this as idolatry, and those opposed to the custom were called iconoclasts or "image breakers." In 726 the Byzantine Emperor Leo

the Isaurian issued an ordinance, directed not against the images themselves, but again prostration and kneeling down before them. This measure met with resistance from Germanus, Patriarch of Constantinople, and from the mass of the people, and led to serious disturbances in many places. In 730 a new imperial edict was issued, forbidding the use of all images for religious purposes. Leo caused the statues in churches to be burned and the paintings on the walls to be effaced, and fearful riots and massacres occurred in consequence. Pope Gregory II remonstrated with the emperor, and the Romans refused to comply with the edict.

In 732 a council assembled in Rome by Gregory III condemned Leo and his abettors. Leo's policy was carried out by his son, Constantine Copronymus. He assembled at Constantinople, 754, a council of 338 bishops, who pronounced all visible symbols of Christ, except in the eucharist, to be either blasphemous or heretical, and the use of images in churches to be a revival of paganism. Leo IV, who succeeded him, pursued the same course; but at his death, 780, the Empress Regent Irene concerted measures with Pope Adrian I for the restoration of images. In 787 the second Ecumenical Council of Nice decreed that "bowing to an image, which is simply the token of love and reverence, ought by no means to be confounded with the adoration which is due to God alone" The contest was prolonged in the East under successive emperors till Theodora assembled a council at Constantinople, 842, which confirmed the decisions of the Nicene Council; but subsequently the Greek Church took the position which it still holds, that no carved, sculptured, or molten images of holy persons or things are allowable, but only pictures, which are held to be not images but representations.

The term iconoclasts or "image breakers" is also applied in history to those Protestants of the Netherlands who at the commencement of the troubles in the reign of Philip II tumultuously assembled and destroyed the images in many Roman Catholic churches. These tumults began, August 14, 1566, at St. Omer in Flanders, and speedily spread all over the N. provinces. See IDOLATRY.

Ic'terus. See JAUNDICE.

Ictinus (Ĭk-tī'nŭs), Greek architect, contemporary with Pericles; was chief architect of the Parthenon, and built the Temple of Apollo Epicurius near Phigalia in Arcadia, and the fane at Eleusis in which the mysteries were celebrated.

I'da, now KAZ-DAGH, mountain in Asia Minor; at the head of the Gulf of Edremid; traverses the ancient Phrygia and Mysia. From it flow the Granicus, the Simois, the Scamander, and other streams whose names are historic. Its highest point, Mt. Gargarus, 5,784 ft., dominated the plains of Troy. Another IDA (now called PSILORITI), equally famous in song and story, is in the island of Crete. It terminates in three peaks, and rises to the height of 7,674 ft. Still another IDA is that of the "gold fields of Mt. Ida" in Otago, S. Isle, New Zealand, about 70 m. N. of Dunedin.

Ida'cius, or Ida'tius, Spanish ecclesiastic; b. Lemica, Spain, in the latter part of the fourth century; appointed bishop of his native city abt. 427, but was deposed by the invading Suevi, 461; died after 469. He wrote a "Chronicum," arranged according to the succession of emperors, and embracing the period from 379 A.D. (at which point Hieronymus breaks off) to 469.

I'daho (name of Indian derivation, meaning "gem of the mountains"), state flower, syringa. State in the W. division of the N. American Union; bounded N. by British Columbia and Montana, E. by Montana and Wyoming, S. by Utah and Nevada, W. by Oregon and Washington; extreme length from N. to S. about 442 m.; mean breadth about 257 m.; area, 84,800 sq. m. Pop. (1907) 273,269;

SEAL OF IDAHO.

capital, Boisé. The surface for the most part is elevated, the Rocky Mountains with their continuation the Bitter Root Mountains separate it from Montana, sending the Kootenai, Cœur d'Alène, and other spurs to the W. The Salmon range, following the Salmon River and its affluents, has some peaks exceeding 12,000 ft. Toward the SE., along a part of the Snake River, is a somewhat elevated plateau, constituting a broad and tolerably fertile tract of arable soil. S. of the Snake River Valley extend the Bear River Mountains, the Goose Creek Mountains, and other ranges. With the exception of Bear River in the extreme SE., the entire drainage of the state is into the Columbia River. It has Clark, or N. Fork of Columbia and its affluents, the Pen d'Oreille Lake and its tributary streams, the Spokane River, with Cœur d'Alène Lake and its affluents, and, as the principal river of the state, which has a course of about 850 m. within it, the Lewis Fork or Snake River, which with its branches, the Clearwater and the Salmon, with their numerous affluents, drains nearly 70,000 sq. m. of the state. The only other river of any size in the state is Bear River, which drains the SE. corner and is tributary of Great

Salt Lake. There are numerous lakes, waterfalls of great height, and, in SE. Idaho, geysers, steam springs, soda springs, and natural hot baths, the region being volcanic. Climate milder than in Montana; snow and rainfall moderate; annual range of the thermometer in N. Idaho, in the lake and river valleys, between 50° and 93° F.; soil, largely of sifting sand, and the surface sterile except where furnished with water by irrigation; mountains well wooded with forests, largely evergreen. In the S. counties, many deciduous trees, and in some districts vast sage plains which are used for grazing, but are adapted to agriculture when irrigated; river valleys very fertile; principal crops, wheat, oats, barley, potatoes, hay, and fruits; the raising of cattle, sheep, etc., an important industry.

Mineral products include gold, silver, lead, copper, lignite coal, salt, sulphur, soda, valuable building stone; total value mineral products, 1907, $21,300,612; including lead, $11,932,314; silver, $5,206,300; gold, $1,255,900; copper, $1,941,460. Leading religious denominations, Church of Jesus Christ of Latter-day Saints, Roman Catholic, Methodist Episcopal, Presbyterian, and Baptist; leading educational institutions, the State Univ. at Moscow, Agricultural and Mechanical College at Idaho Falls, normal schools at Albion and Lewiston, and a number of denominational colleges or academies; principal reformatory and penal institutions, an asylum for the insane at Blackfoot and a penitentiary at Boisé. Cities and towns having over 1,000 population (1900): Boisé, Pocatello, Moscow, Lewiston, Wallace, Montpelier, Weiser, Idaho Falls, Grangeville, Rexburg.

With the exception of the bold explorers Lewis and Clark, who early in the nineteenth century followed up nearly to their sources the two forks of the Columbia, Clark's and Lewis's Forks, which traverse this state, the only white men who had trodden its soil previous to 1850 were trappers and hunters. It formed a portion of the Territory of Oregon up to 1863. Idaho was organized as a territory, March 3, 1863, and admitted as a state, 1890. When first organized it included portions of the previous territories of Oregon, Washington, Utah, and Nebraska. In 1864 its boundaries were changed and a part set off to Montana.

I'das, in Greek mythology, son of Aphareus and Arene. When Apollo was wooing Marpessa, the daughter of Evenus, Idas kidnaped her. He was pursued and overtaken by Apollo at Messene, where the god and the mortal fought for the maid. So even were the honors that the fight was stopped by Zeus, who allowed Marpessa to choose between the two. She chose Idas, because she feared that Apollo would finally desert her. Idas and his brother Lynceus were first cousins of Castor and Pollux, with whom they made a plundering expedition into Arcadia. By a trick Idas became possessed of all the booty, so that a fight ensued between the cousins. First Idas killed Castor, then Pollux killed Lynceus, then Idas wounded Pollux so badly that Zeus snatched him up to Olympus and killed Idas with a thunderbolt.

Iddesleigh (Id'ĕs-lĭ), **Earl of.** See NORTHCOTE, SIR STAFFORD.

Ide'alism, a philosophical doctrine defined (*a*) as holding that in external perception the objects immediately known are ideas, or (*b*) as holding that the external world is a mere phenomena manifesting a supersensuous essence which is (1) spirit, reason, or thinking intelligence and will, or (2) force, law, or some unconscious principle of evolution. According to the former definition, nearly all philosophers, excepting those belonging to the Scottish school, would fall in the class of idealists, thus numbering such different systems as those of Locke, Hume, Kant, Plato, Aristotle, Descartes, etc., all in one school. According to the latter definition, the theistic or spiritualistic thinkers would be classed in one division of the idealistic school, while the pantheistic thinkers (including even the modern positivists) would belong to the other division; and opposed to these would be the nominalistic branch of materialists and the self-styled "common-sense" thinkers. It has been contended, in fact, that all philosophy must be impliedly idealistic in that it undertakes to explain immediate things—or at least the knowledge of them—and thereby presupposes a unity or ground for them upon which they depend.

All dependent things are in a certain sense ideal or potential, and underlying the external multiplicity of such things there is a unity. Were there no interdependence or correlation among things, it is held that there could be no philosophy. Plato is the idealist *par excellence*, and the father of that school of thinkers. His "ideas" or archetypal forms are immaterial and eternal essences which are shadowed forth or manifested by finite realities. Finite things are "copies" of ideas, and by reason of their inadequateness as copies they are in a state of perpetual flux or transition from one phase to another, each imperfection giving place to a more correct copy, which, again, is defective in some other respect. Substantially identical with this is the doctrine of Aristotle, who opposes the doctrine of "ideas" as separate archetypes, and lays stress on an intelligent First Cause as the supreme principle of explanation. Christian philosophy, as such, is essentially idealistic, inasmuch as it has to provide a speculative basis for the doctrine of a personal Creator and for an immortal creature. Thomas Aquinas says that God "eternally knows all things as present, and through this knowledge these things themselves are caused."

Idealism, according to Sir W. Hamilton, deduces the object from the subject, while materialism deduces the subject from the object. This would exclude the numerous forms of idealism wherein both subject and object are deduced from a spiritual principle. Among distinguished modern philosophers, called idealists, are to be named Berkeley and Malebranche as theological idealists; Descartes, as problematical idealist; Hume, as skeptical

idealist; Kant, as transcendental idealist; Fichte, as subjective idealist; Schelling, as objective idealist; Hegel, as absolute idealist; Schopenhauer, as pessimistic or nihilistic idealist; Jacobi and Schleiermacher, as sentimental idealists; Spinoza, as substantial idealist. These and similar designations are liable to convey a false impression unless supplemented by reference to the full systems of those thinkers. See MATERIALISM.

Ideler (ē'dĕ-lĕr), **Christian Ludwig,** 1766–1846; Prussian scientist; b. Gross-Brese; appointed Prof. of Astronomy and Chronology at the Univ. of Berlin, 1821; principal works "Handbuch der Mathematischen und Technischen Chronologie" and "Die Zeitrechung der Chinesen."

I'deo-mo'tor Ac'tion, muscular movement which is prompted by an idea or memory in consciousness. Imitation is an example. It is contrasted with "sensori-motor action," which is a movement brought about in response to a sensation.

Ides (īdz), in the Roman calendar, the 15th day of March, May, July, and October, and the 13th day of the other months. The eight days preceding the ides were named from it, and styled the first, second, third, etc., day before the ides.

Id'iocy. See INSANITY.

Idiosyn'crasy, marked individual trait of any function of body or of mind which is possessed by only one or by very few persons. Thus certain persons are peculiarly affected by some odors, sounds, animals, etc. Some cannot take quinine without breaking out in a rash, others cannot eat lobster without grave disturbance. Certain bodily idiosyncrasies appear to be compatible with perfect health. Others arise from diseased conditions, and cease upon the cure of the disease. Mental idiosyncrasies may not amount to marks of insanity, and yet it is impossible to draw a line between the two. Often an idiosyncrasy is no more than an affectation assumed to arouse interest in others and implying the superior refinement of one's own organization.

Idol'atry, the worship of images for themselves in contradistinction to the reverence for images because of what they recall—their use being merely to direct the mind in worship to the Deity, or to saints represented. As used by theologians, the term idolatry includes fetishism, or the worship of animals, trees, rivers, hills, stones, etc.; the worship of the powers of nature, the sun, moon, the stars, etc., hero and ancestor worship, as well as the worship of abstractions, such as justice, etc. Idolatry appears to be of great antiquity. The Turanian races worshiped the spirits of their ancestors, and represented these by little images, as did the Romans, who derived the custom from the Etrurians. As soon as the belief was established that the departed were immortal, it would occur to the survivors that their spirits might benefit them, and that this might be made sure by worship.

The Indo-Europeans deified not only the principal forces in nature, but all their subdivisions, so that eventually there was a god or goddess for every separate river or kind of plant—all represented more or less by images, which were worshiped, but all Indo-European races have records of a primitive time when idols were unknown. The Semitic races limited their ideas, expressed in gods, to the first principles of reproductiveness and death, especially the former, whence resulted a sex worship and obscene rites. But they found in Moses and Mohammed reformers who vigorously repressed all nature worship and its resultant idolatry to such an extent as very strictly to forbid the making of images. The literal worship of images in themselves appears to be in proportion to their monstrosity and ugliness. The Greeks made beautiful statues of their gods, but seem to have merely admired them, while they adored the ugly ones. The tendency of humanity to invest material objects with magical virtues is universal. A savage who has by chance always killed his enemies or his game with a certain weapon soon believes that it possesses a peculiar virtue, and this belief readily extends to ornaments and amulets, which are supposed to bring luck.

From amulets—pebbles or beads—the faith readily extends to human images, whether of ancestors or presenting powers of nature. Idolaters of every country endeavor to please their divinity by sacrifices, and many punish it when their prayers are not answered. A curious form of idolatry is the totem worship by which a certain sacred animal is regarded as originating and protecting families and tribes of a common descent. This was to be found, *e.g.*, among the Teutonic Wolfinge—whose names survive in Rudolf, Wolfgang, etc. —as also among N. American Indians. Sir John Lubbock briefly explains this as follows: "In endeavoring to account for the worship of animals we must remember that names are very frequently taken from them. The children and followers of a man called the Bear or the Lion would make that a tribal name. Hence the animal itself would be first respected, then worshiped." The most extensively disseminated idols are those of Buddha and the Chinese queen of heaven, which bears a striking resemblance to Isis. See ICONOLATRY.

Idomene'us, in Greek mythology, son of Deucalion and grandson of Minos, King of Crete. He was distinguished for his great beauty and nobility of character. Having been one of the suitors of Helen, he was forced to join the expedition against Troy, where his prowess made him one of the first of the heroes. On his way back from Troy, being overtaken by a storm, he prayed to Poseidon for deliverance, vowing to him whatever should first meet him on his return home. He kept his vow, and offered up in sacrifice his own son. For this crime a plague was sent on Crete, Idomeneus was driven from the island, and settled first in S. Italy, where he built a temple to Athene. Subsequently he settled in Colophon, in Asia Minor, where he died after hav-

ing built a temple to Apollo. His grave was shown on the neighboring Mt. Cercaphus, as well as at Cnossus, in Crete, where, according to another myth, he died.

Idumæa (id-ū-mē'ā), territory of W. Asia, bounded N. by Judea, W. by the Mediterranean. At one time it comprised parts of Judea as far N. as Hebron, and in Arabia the peninsula of Petræa. It was inhabited by the descendants of Esau, and was annexed to Judea by David, and later by the Maccabees. The relations between the Jews and the Idumæans (Edomites) were always hostile and full of hatred, even after the Jews had received an Idumæan dynasty in the son of Herod the Great, in whose time the Idumæans were, however, Jews in religion.

Idun (ē'dōn), in Scandinavian mythology, the wife of Brage. Her name expresses a constant activity and renovation. She keeps in a box the apples which the gods have only to taste of to become young again when they feel old age approaching. It is in this manner that they will be kept in perfect youth until Ragnarok.

Ierne (ī-ėr'nē). See IRELAND.

Iesi (ē-ā'sē). See JESI.

Ignacio (ēg-nä'sē-ō), **Joaquim José**, 1808–69; Brazilian naval officer; b. Lisbon, Portugal. When a child he went to Brazil, where he entered the navy, 1822, distinguishing himself in the war for independence, in the civil wars in Rio Grande do Sul and Pernambuco, and on the Rio de la Plata; was Minister of Marine, 1861; during the war with Paraguay commanded the Brazilian flotilla, 1867 and 1868, and the most memorable exploits of the conflict are connected with his name; his brilliant passage of the Paraguay at Humaitá (February 19, 1868) was particularly notable. For these services he was successively created Marquis and Viscount of Inhauma, and promoted to full admiral.

Ignatieff (ig-nä'tē-ėf), **Nicholas Paulovitch**, 1832–1906; Russian diplomatist; b. St. Petersburg; was educated for the army; entered the Guards, 1849; became lieutenant general and aid to the czar; was sent on a special mission to Khiva and Bokhara, 1858; appointed ambassador to China, 1860, and to Turkey, 1864; made Russia the leading influence with the Porte; championed all the Slavic peoples under Ottoman rule during the Russo-Turkish War, 1877–78; appointed Minister of the Interior after the assassination of Alexander II (1881); resigned because of disagreement with new czar's policy, 1882; was afterwards a councilor of the empire and a conspicuous leader of the pan-Slavic party in Russia; special commissioner to investigate conditions in S. Russia after "Red Sunday" (January 22, 1905); assassinated at Tver.

Ignatius de Loyola (ig-nā'shi-ūs dā lō-yō'lā). See LOYOLA, IGNATIUS DE.

Ignatius, Saint, surnamed THEOPHORUS, d. 107 or 115; one of the Apostolic Fathers of the Church. Eusebius says that he was appointed Bishop of Antioch, 69. The "Martyrium Ignatii" affirms that he was a disciple of St. John, and ordained by the apostles themselves, and that he was condemned by Trajan to be thrown to wild beasts in the Roman amphitheater; but it is more probable that he died in Antioch. His day in the Latin church is February 1st; in the Greek, December 20th. Fifteen letters ascribed to Ignatius are now extant. The seven mentioned by Eusebius are generally accepted as genuine by Roman Catholic theologians; but Lipsius, Bunsen, and several eminent Protestant authorities reject all but those to the Ephesians, Romans, and Polycarp. The Ignatian writings exist in several editions.

Ignatius, Saint, abt. 798–878; patriarch of Constantinople; was the youngest son of the emperor Michael I, and became patriarch 846; was an enemy of the iconoclasts, and refused to admit Bardas, brother of the empress Theodora, as a communicant, on account of his reported immorality. Ignatius was consequently deposed and replaced by Photius, treated with the greatest cruelty, and banished to Mytilene; but was recalled, 867.

Ignatius Bean, beanlike seed of *Strychnos ignatii*, a rather large shrub with curious vinelike branches growing in the Philippines, and belonging to the family *Loganiaceæ*. The seed is an inch long, half an inch thick, and has the properties of nux vomica, but more actively, for it contains a much larger percentage of strychnia.

Ignis Fatuus (ig'nis fāt'ū-ūs), literally, "fool's fire," luminous appearance in summer and autumn nights on marshy land, near stagnant water, in graveyards, and other places where decomposition is going on, probably due to the spontaneous ignition of some of the gases given off by decomposing animal or vegetable matter. It is an unsteady, bluish light, usually seen a few inches above the surface of the ground, sometimes stationary, but commonly moving with rapidity. It appears brightest at a distance, and recedes from the observer as he tries to approach it; thus travelers have lost their lives through being deluded by it into dangerous bogs. From its resemblance to a lighted wisp of straw or torch borne quickly along, it has received a number of names, such as Will-o'-the-Wisp, Jack (or Peg) o'-Lantern, Friar's Lantern, Kit-with-the-Canstick (*i.e.*, candlestick), and has given rise to many popular legends.

Igneran'tines. See BRETHREN OF THE CHRISTIAN SCHOOLS.

Igorrote (ē-gōr-rō'tā), general name covering certain tribes of Malay-Mongoloid blood inhabiting the Philippine Islands. They are also known as "mountain people." They are a warlike race, numbering, according to the census of 1903, about 158,000. Among the peculiar Igorrote customs is that of trial marriages, which are consummated in a public building in the village. The Igorrotes are also noted for their fondness for roast dog as an article of diet.

Iguana (ĭ-gwä'nä), lizard constituting the type of the family *Iguanidæ*. The common iguana attains a length of 4 or 5 ft., of which the tail is about two thirds; it is found in tropical S. America and the W. Indies. The color above is greenish, with bluish and slaty

AGAMA COLONORUM.

tints, and below greenish yellow. The flesh of the iguana is considered a great delicacy. The iguanas of the E. hemisphere, of the acrodont subfamily, are often called agamas, from one of the principal genera. None of this subfamily are found in America. The common agama is the largest of the genus, being from 12 to 16 in. long; it is found on the Guinea and Senegal coasts.

Iguanodon (ĭ-gwä'nō-dŏn), gigantic fossil saurian reptile, discovered by Dr. Mantell in the Wealden formation of Great Britain, 1822, and so named from the teeth resembling in shape those of the iguana. This reptile was

IGUANODON.

estimated by Owen as about 28 ft. in length, of which the head was 3 ft. and the tail 13 ft.; it stood higher on the legs than any existing saurian; was terrestrial in its habits; and, from the worn condition of its teeth, was herbivorous.

Ihlang-Ihlang (ē-läng'-ē-läng'), rich and powerful perfume of *Unona odoratissima*, a noble forest tree of the Philippines and other Malay islands. The volatile oil of the flowers of the tree is largely employed in making the rich handkerchief perfume of this name. This oil is distilled in the East, and is worth about $250 a pound.

Ijssel (ĭ'sĕl). See YSSEL.

Ikao (ē-kä'ō), village in Kozuke, Japan, much frequented by foreign visitors; about 88 m. N. of Tokyo; at an elevation of about 2,600 ft. above sea level, on the NE. slope of Mt. Haruna; is famous for its mineral hot waters, which issue from the ground at a temperature of 115° F., the water, containing small quantities of iron and sulphate of soda.

Île-de-France (ēl-dē-fräṅs'), old province of France, with Paris for its capital; now divided into the departments of Seine, Oise, Aisne, Seine-et-Marne, and Seine-et-Oise. It became a dukedom in the ninth century, and, 987, Hugh Capet, Duke of the Île-de-France and the founder of the Capetian dynasty, came to the French throne.

Ileum (ĭl'ē-ŭm), lowest portion of the small intestine, extending from the jejunum to the head of the colon. In man it is about 12 ft. long, thus including some three fifths of the length of the small intestine. It is 1¼ in. in caliber, is thinner and narrower than the jejunum, has less marked *valvulæ conniventes*, and is ordinarily the only part of the intestine which has Peyer's patches (agminated glands) on its inner surface.

Il'eus, very painful disease of the intestine, produced by mechanical obstruction, as by twisting, intussusception, or knotting of the entrail. Intense pain, persistent vomiting, constipation, hiccough, etc., are characteristic symptoms. Intussusception, or the passage of a part of the intestine into the cavity of another part, is one of the most common conditions, as when the lower part of the small intestine is slipped down into the large intestine. The disease is very often fatal. Prompt surgical interference is the most prudent treatment, though sometimes the obstruction may pass naturally away.

I'li, river of central Asia, the principal feeder of Lake Balkash; rises about lat. 43° N., lon. 84° E., in Chinese territory; flows W. past Kulja, then passes into the Russian province of Semiryetshensk, and after passing the Russian fort of Iliisk turns NW. and spreads into an enormous arid delta; length, 1,000 m.; one third to one half navigable for small craft.

Ilïa' Mu'romets, Russian typical hero and strong man, the favorite of the ancient Russian "Bylinas," or popular epic songs, who defends widows and orphans and fights Tartars and robbers, but is often out of favor with the ungrateful king whom he serves.

Il'ïad, poem by Homer of 15,593 verses, divided into 24 books. The story in brief is this: Paris, the voluptuous son of Priam—King of Ilios (Ilium), a city on the Trojan plain, in the NW. corner of Asia Minor—is aided by Aphrodite, the goddess of love, to carry

away the beautiful Helen, daughter of Leda and Zeus, from her husband, Menelaus, King of Sparta. The injured husband's brother, Agamemnon, King of Mycenæ, rouses the Greeks (who are called Achæans and Argives) to recover Helen and her treasures. Achilles, Ajax, Odysseus, Diomed, Nestor, and many other chieftains follow the summons with their men. Nearly 1,200 ships and about 100,000 men assemble at Aulis in Bœotia, and sail for Troy. For ten years they are encamped before the city. Since they brought with them no supplies, they are obliged to make expeditions for plunder, and destroy many towns in the neighborhood, slaying the men or selling them into slavery. Among the captives is Briseis, a daughter of an old priest of Apollo, who is given as a prize of honor to Agamemnon.

The "Iliad" opens in the tenth year of the war, with the visit to the Greek camp of this old priest, offering rich ransom for his daughter. The Greek king rudely dismisses the suppliant, and the god Apollo avenges the slight to his minister by sending a pestilence upon the Greeks. When the cause of this plague is known, Achilles demands the return of the maiden. This is granted, but the king makes good his loss by seizing the prize of Achilles, who now sulks in his tent. In the three following days of battle the Trojans have the advantage, and finally break into the Greek camp. Patroclus, the friend of Achilles, is slain. Roused by the death of his comrade, Achilles reënters the combat, and on the fourth day of battle slays Hector, Priam's noblest son. The action of the "Iliad" lasts for six weeks, and closes with the ransom and burial of Hector's body.

Il'ijats, or Il'iyats, nomadic tribes of Persia, of various origin, mostly orthodox or Sunnite Mussulmans. Nominally each tribe is confined to its own grazing ground, for which a tribute from their flocks is exacted by the government, but frequently their favorite occupation is robbery.

Iliniza, or Illiniza (ē-lē-nē'sä), mountain of Ecuador, in the W. Cordillera; 20 m. SSW. of Quito; capped by two peaks, the S. one being 17,406 ft. high. Whymper failed in an attempt to reach the summit. Iliniza is presumably an extinct or quiescent volcano; but there is no record of an eruption. The upper portion is covered with perpetual snow, and usually cloud-capped.

Il'ion, or Il'ium. See TROY.

Ilissus (ī-lis'ŭs), small stream of Attica that rises in two arms on Hymettus and flows close under the E. and S. walls of Athens toward the Bay of Phalerum. In ancient times it was celebrated for its beautiful scenery.

Illampu (ēl-yäm'pō), or **Sorata** (sō-rä'tä), mountain of Bolivia, in the E. Cordillera, overlooking Lake Titicaca; 50 m. NNW. of La Paz; is 21,484 ft. in height, and a magnificent mass, with three principal peaks. Seen from Lake Titicaca it is the grandest mountain in America. It has never been scaled.

Il Las'ca. See GRAZZINI.

Illimani (ēl-yē-mä'nē), a mountain of Bolivia, in the E. Cordillera; forming the SE. extremity of the Sorata or La Paz group; 25 m. ESE. of the city of La Paz and 75 m. SE. of Illampu; lat. 16° 33′ 10″ S. and lon. 67° 46′ 7″ W. It has three peaks; the highest has never been scaled, but in 1877 M. Wiener and two companions reached one of the other summits, which was found by aneroid to be 20,116 ft. above the sea; Wiener calculated that the highest point was 20,692 ft. Vegetation ceases at about 11,400 ft., and the limit of perpetual snow is about 14,900 ft.

Illinois (il-i-noi'), name derived from the Illinois confederation of Indians, popularly called the PRAIRIE STATE; state flower, the rose; state in the N. central division of the N. American Union; bounded N. by Wisconsin, E. by Lake Michigan, the states of Indiana and Kentucky, SE. by the Ohio River, flowing between it and the State of Kentucky, and W.

and SW. by the Mississippi, which separates it from Iowa and Missouri. Its territory and jurisdiction extend to the middle of Lake Michigan, and of the channels of the Mississippi and Wabash rivers, but to the N. bank of the Ohio only; area, 56,650 sq. m.; extreme length, N. to S., 385 m., and E. to W., 218; pop. (1906) 5,418,670; capital, Springfield.

The physical conformation of the State presents the appearance of an inclined plane with a moderate descent in the general direction of the streams toward the S. and SW. The greatest elevation above the sea level is found in Jo Daviess Co., 820 ft., and the point of lowest depression at Cairo, 300 ft., while the altitude at Chicago is 583 ft. A spur from the Ozark Mountains, projected across the S. part of the state, rises in Jackson Co. to over 500 ft. Illinois is drained by the Mississippi, which forms its entire W. border, and on the S. by the Ohio, with the Wabash on the E., and the Illinois, its largest stream, wholly within the state, nearly 500 m. in length, with its affluents, the Kankakee, Des Plaines, Mackinaw, Sangamon, Vermilion, and Fox rivers; the Kaskaskia, rising in Champaign Co., drains the region between the Illinois and the Wabash, and Rock River the N. portion of the state. The Big Vermilion, Embarras, and Lit-

tle Wabash are tributaries of the Wabash, and the Saline and Cash of the Ohio.

Mineral products include coal, lead ore, copper, zinc, iron, fine clay, potter's clay, kaolin clay, from which is manufactured the finest kind of porcelain, limestone, sandstone, fluorspar, natural cement, glass sand, petroleum, and natural gas. The area of coal in the state embraces 42,900 sq. m. It is divided into six principal workable seams, ranging from 2 and 3 ft. in thickness to 7, which are found at a depth varying from a few feet to 800. The most valuable and productive mines are in the vicinity of Springfield, Belleville, Braidwood, La Salle, Peoria, and in Jackson Co. Total value of mineral products, 1907, $145,768,464, including coal, $54,687,382, pig iron $52,229,000, and clay products $13,220,489.

Climate generally healthful. In the N. portion the annual range of the thermometer is very great, the summer heat being at times intense and the cold of winter very severe. In 40° N. lat. the mean temperature of the year is about 54°; of the summer, 77°, and of the winter, 33° 30′. At Beloit on the N. line of the state the mean annual temperature is 47° 30′; at Cairo, 58° 30′. About two hundred and forty-five days of the year are clear and one hundred and twenty cloudy or rainy.

The principal crops are corn, wheat, oats, barley, buckwheat, potatoes, hay, tobacco, apples, pears, peaches, and small fruits. The production and value of the most important crops, 1908, were: corn, 298,620,000 bu.; wheat, 30,212,000; oats, 94,300,000; potatoes, 11,076,000, and hay, 4,743,000 tons. Its live-stock interests were represented by 1,591,000 horses, 143,000 mules, 1,184,000 milch cows, 2,164,000 other cattle, 793,000 sheep, and 4,672,000 swine.

Chief manufacturing industries, slaughtering and meat packing, iron and steel, foundry and machine-shop products, clothing, distilled and malt liquors, flour and grist, agricultural implements, railway cars, printing and publishing, furniture, planing-mill products, electrical machinery, gas; number of factory-system establishments (1905) 14,921; capital employed, $975,844,799; value of products, $1,410,342,129. The fisheries of the state, centering chiefly at Chicago, are very important. Commerce between Chicago and the ports on the Great Lakes, and Atlantic and European ports is large and increasing. The Illinois and Michigan Canal unites Lake Michigan with the navigable waters of the Illinois River, thus ultimately connecting the Gulf of St. Lawrence with the Gulf of Mexico. The entire length is 96 m.

The higher educational institutions include the State Normal Univ. at Normal; the Southern Normal Univ., Carbondale; the Univ. of Illinois, Urbana; Cook County Normal School, Englewood; the Univ. of Chicago; Knox College (nonsectarian), Galesburg; Illinois College (Presbyterian), Jacksonville; Shurtleff College (Baptist), Upper Alton, and Northwestern Univ., Evanston. The charitable institutions are the Deaf and Dumb Institution, Blind Institution, Central Insane Hospital—all in Jacksonville; Southern Insane Hospital in Anna, Northern Insane Hospital in Elgin, Eastern Insane Hospital in Kankakee, Soldiers' Orphans' Home in Normal, Asylum for Feeble-minded Children in Lincoln, Soldiers' and Sailors' Home in Quincy, and the Eye and Ear Infirmary in Chicago. The reformatory and penal institutions comprise a penitentiary in Joliet and one in Chester, an asylum for insane criminals in Chester, and a state reformatory for juvenile offenders in Pontiac.

Leading religious denominations, Roman Catholic, Methodist Episcopal, Baptist, Lutheran, Disciples of Christ, Presbyterian, German Evangelical, and Congregational. Principal cities, and towns, Chicago, Peoria, Quincy, Springfield, Rockford, E. St. Louis, Joliet, Aurora, Bloomington, Elgin, Decatur, Rock Island, Evanston, Galesburg, Belleville, Moline, Danville, Jacksonville, Alton, Streator, Kankakee, Freeport, Cairo, Ottawa, La Salle.

Illinois was first seen by the French explorers Joliet, 1673, La Salle, 1679, Tonty, 1679-90, and their missionary companions, of whom Marquette was one; and its first permanent settlements were made by their French followers, voyagers, and traders at Cahokia and Kaskaskia, 1700. The latter place was the capital of the territory for seventy-eight years. The French retained control of the country until 1763, when by the conquest of Canada by Great Britain that power became its owner under treaty stipulations. The British remained in possession of the country, removing the capital to Kaskaskia, 1772, until July 4, 1778, when it was captured in an expedition from Virginia, commanded by George Rogers Clark, and was attached to Virginia as the county of Illinois. All state claims having been ceded to the Federal Government, 1785, Congress provided for and, 1787, established the government of the NW. Territory, of which Illinois formed the most conspicuous part. It remained in a territorial condition under the NW. or Indiana territories until 1809, when it was formed into a territorial government by itself, resuming its old name of Illinois. At this time it was divided into two counties, and could boast of a population of only 12,000.

The state was admitted into the Union, December 3, 1818, with a population of only 34,620, smaller than any other state when admitted. The Black Hawk War of 1832, in which 8,000 volunteers and 1,500 regular soldiers were called out to expel from the state 500 Sax and Fox Indians with their women and children, at a cost of 1,000 lives and $2,000,000, while successful, reflected but little credit on either the policy, bravery, or humanity of the people of that day. The construction of the Illinois and Michigan Canal, which was begun, 1836, but owing to the "hard times" was not completed until 1848, gave a most important impetus to the growth and prosperity of the state. The failure of the preposterous internal improvement system projected by the legislature, 1836, involved the state in a debt of over $13,000,000, which required more than forty years of taxation to liquidate.

Illinois sent Abraham Lincoln to preside over the nation from 1861 to 1865, and gave Ulysses S. Grant his first commission in the Civil War. Under Gov. Richard Yates the state furnished a greater number of volunteers in proportion to population than any other, the number being 255,057, or, reduced to a three years' standard of service, 214,133.

Illinois, members of a confederacy of N. American Indians belonging to the Algonquin stock; formerly occupying S. Wisconsin, N. Illinois, and sections of Iowa and Missouri; and comprising the Cahokia, Kaskaskia, Michigamea, Moingwena, Peoria, and Tamaroa tribes. The "Jesuit Relation," 1660, represents them as living SW. of Green Bay, Wis., in sixty villages, and credited them with 20,000 men or a population of 70,000. They were badly defeated by the Iroquois, 1679, but recovered and aided the French against the Iroquois. In 1700 the Kaskaskias removed from the upper waters of the Illinois to the spot that bears their name. The tribe afterwards suffered much in wars with the Foxes. The Illinois joined the Miamis in their war against the U. S., but made peace at Greenville, August 3, 1795. In 1818 they ceded all their lands in the State of Illinois. A mere handful of the Peorias and Kaskaskias remain, and are settled in Indian Territory.

Illinois Riv'er, largest stream in Illinois, formed by the junction of Des Plaines and Kankakee rivers, and, nearly bisecting the state, flows SW., traversing Peoria Lake, and reaches the Mississippi 20 m. above the mouth of the Missouri; is navigable 245 m. by steamers, and, with the canal from Chicago to La Salle, affords an all-water route from the Mississipi to Lake Michigan.

Illinois, Univer'sity of, coeducational, nonsectarian institution, in Urbana, with schools of medicine and pharmacy in Chicago; chartered as the Illinois Industrial Univ., 1868; organized into the Colleges of Agriculture, Engineering, Science, and Literature, 1871; name changed to present form, 1885; has grounds and buildings valued at over $1,400,000; scientific apparatus, $460,000; productive funds, $625,000; volumes in library, 80,000; professors and instructors, 482; students in all departments, 4,316.

Illu'minated Man'uscripts, manuscripts which are ornamented by means of variety of form and color in the writing itself, and especially in the large initial and other capital letters; or by borders or fantastic scrollwork on the margins; or by patterns covering large parts of the page and either partly connected with the writing or wholly separate from it; or by pictures of figures or groups combined with the large letters, either actually within the loops of the P. D. G. O, or the like, or within a frame which incloses the letter also; or by pictures wholly apart from the writing, or, finally, by combinations of these different processes. The beautiful Persian and other manuscripts of the Levantine nations, from the fourteenth to the eighteenth century, often have the opening pages nearly filled with elaborate ornament wholly without lettering, and other pages where only two or three brief texts in highly ornate Arabic characters are combined with the patterns. These books are generally copies of the Koran. The art of illuminating books, derived from Greece, where it was early practiced, was never lost in Europe until some time after the introduction of printing. Illumination was the art which was more freely and successfully practiced in Europe throughout the earlier Middle Ages than any other; and after architecture took the highest place in the eleventh century illumination continued to be the most successful decorative art next to those immediately connected with building. The books most frequently made beautiful in this way were church-service books of different kinds, Bibles and psalters; books of other than theological subject were less common, though not absolutely rare. The best epoch is perhaps the thirteenth century. See MANUSCRIPT.

Illumina'ti (Lat., the "enlightened"), name assumed at different periods by sects of mystics or enthusiasts. The most celebrated society of the name was that founded 1776 by Adam Weishaupt, a German Prof. of Canon Law at Ingolstadt, with the ostensible object of binding in one brotherhood men of all countries, ranks, and religions. At the height of its prosperity the society had 2,000 members in various parts of Europe. Its mysteries related to religion, which was transformed into naturalism and free thought, and to politics, which inclined to socialism and republicanism. The order corresponded in cipher, and used a peculiar phraseology. Internal dissensions and the opposition of the Roman Catholic clergy led to its overthrow. The society was prohibited by the Bavarian Govt., 1784, and its papers were seized and published.

Illu'minating Gas. See GAS.

Illustra'tion, picture, ornamental border, or headpiece, or the like, forming part of a book or periodical and acting as an elucidation of the text or simply as a decoration. The term is also applied to the art of preparing such pictures or drawings for books and periodicals. Of the books printed before 1500 A.D., called incunabula, a number were illustrated with wood cuts, and from that time on until the last quarter of the nineteenth century wood engraving was the chief means of book illustration. Prints from steel or other metal engravings have also been used, but much more rarely, except as insets, because the sheet of paper has to be printed directly from the metal plate and separately from the type; whereas wood engravings can be printed with the letterpress. Since abt. 1870 photographic process-engraving has been very largely used for book illustration. The method of illustration called *Grangerism*, or extra illustration, consists in the insertion in one copy of a book of a number of prints, maps, or pages from other books, or hand-made drawings, the subjects of which may have to do with the subject of the

book chosen for illustration. See ENGRAVING, LITHOGRAPHY, PHOTO-ENGRAVING.

Illyricum (ĭ-lĭr'ĭ-kŭm), or **Illyr'ia,** name which now has no geographical or political signification, but which at different epochs has denoted important provinces of different empires. It was in ancient times inhabited by a fierce, warlike, and savage tribe, allied to the Thracians and addicted to robbery and piracy. The E. portion of the country, corresponding nearly to the modern Albania, was conquered, 359 B.C., by Philip of Macedon, and annexed to Macedonia. The W. portion, comprising the modern Dalmatia, Croatia, Herzegovina, and parts of Bosnia, remained independent till the middle of the eighteenth century before the Christian era, when it was conquered by the Romans and made a Roman province. At the division of the Roman Empire both Illyris Græca and Illyris Romana fell to the E. Empire, but the Slavic tribes which had settled in Illyris Romana soon made themselves independent. During the Middle Ages Illyricum was divided between the Venetians, the Hungarians, and the Turks, and the name fell out of use until Napoleon, 1809, organized the Illyrian provinces, consisting of Carinthia, Carniola, Dalmatia, Istria, and parts of Croatia, and incorporated them with France. In 1816 these provinces were formed into a kingdom and annexed to Austria. The kingdom was dissolved, 1849, and for administrative purposes divided into provinces.

Ilmen', lake of W. Russia, in the government of Novgorod; is 30 m. long by 24 broad; well stocked with fish; but unfit for navigation on account of its storms and shallowness. The Volchof connects it with the Lake of Ladoga.

Ilme'nium, supposed element announced by Hermann; regarded by Rose and by Marignac as impure niobium (columbium).

Iloilo (ē-lō-ē'lō), port of the island of Panay, Philippine Archipelago; on the SE. coast, on the strait separating Panay from Negros. Not counting Manila, it is the most important of the four ports opened to general commerce, 1885. The port is very safe, but not accessible to large vessels. Pop. (1903) 19,054.

Ilopango (ē-lō-pän'gō), small lake of Central America, in republic of San Salvador; bordering on the departments of La Paz, San Salvador, and Cuscatlan; in the center of a very fertile, well-populated, and well-cultivated plain, and celebrated for its beauty. In 1880 a volcanic eruption within the lake elevated its level and raised a cone 35 ft. high, which subsequently attained a height of 200 ft.

I'lus, in Greek mythology, son of Tros. In an athletic contest instituted by the King of Phrygia he won the prize of fifty youths, fifty maidens, and a spotted cow, and was instructed by an oracle to follow the cow and found a city where she should lie down. The cow lay down on the hill of Phrygian Ate, and here Ilus founded a city, which he named Ilium. Not satisfied, he prayed for a further sign and in response Zeus sent him the celebrated Palladium of Troy.

Im'age Wor'ship. See ICONOLATRY.

Imag'inary Quan'tities, in algebra, those quantities which arise when we have to express the square root of a negative quantity. Since the product of two negative quantities is always positive, as well as is that of two positive quantities, it follows that, so long as we restrict ourselves to these two classes of quantities, a negative square is impossible. But, in stating a problem, the result will frequently come out as the square root of a negative quantity. The ordinary interpretation of such a case is that the problem involves some condition which is impossible of fulfillment. For example, if we are required to find by algebra the points in which a given straight line intersects a given circle, it may happen that the straight line and circle are so given that they do not intersect at all. Then the algebraic solution will give the square root of a negative quantity. In pure algebra the imaginary unit need be nothing more than a quantity whose square is -1, to which we are not required to give any meaning, any more than we are to simple x, when we use it in an equation. The great advantage of using it is that all equations in algebra thus become susceptible of a solution. Without it we should have to say, for example, that some quadratic equations had two roots, while others had none at all; that some cubic equations would have one root only, and some would have three, etc. But when we allow ourselves to use the imaginary unit, then every quadratic equation whatever, even if its coefficient be imaginary, will have two roots, every cubic equation three roots, etc. Thus for algebraists these quantities are just as real as any others, and they have the great advantage of making algebra into a complete science.

Imagina'tion, the mental power of representing by images, including memory and association, as well as the constructive working up of images. The imagination never creates; it only gives form to ideas revived. The power of recalling mental images varies greatly with individuals and at different periods of life. Images of sight are most distinct and lasting, other images of childhood are strongest in our memory. A small proportion of persons have a peculiar mental diagram in which they arrange numbers, colors, etc., when imagining them. Such "number forms" seem to be innate and hereditary. Some individuals attach particular colors to particular sounds.

By passive imagination is meant the spontaneous uncontrolled play of images in consciousness, found in its simplest type in the incoherent forms of dreams. When we relax the will and fall into reverie or day dreams, a spontaneous flow of images is realized, yet it is never so detached and incoherent as in dreams. We can usually detect, even in such intellectual abandon, the principles of the regular association of ideas. The combining function of passive imagination is called *fancy*; it

is the seeking out of commonplace experiences with images brought from distant and unexpected regions. Fancy usually enlarges or diminishes the size of things. Things which we fear are apt to be very large, and things which we despise, very small. Constructive or active imagination is the recombining of former thoughts under the guidance of an idea or plan. It supplies the motive power in all intellectual and artistic work, and produces what Newton called "patient thought"—a prolonged and concentrated mental action.

Im'bros, mountainous island in the Ægean; 11 m. W. by N. from the Dardanelles; is 24 m. in circuit, well wooded and fertile, producing oil and wine, and abounding in game. Belonging to the Ottomans, it frequently serves as a place of banishment for disgraced pashas.

Immac'ulate Concep'tion, doctrine of the Roman Catholic Church, which teaches that the Virgin Mary was in her conception exempt from all stain of original sin. On December 8, 1854, Pius IX declared in the constitution "Ineffabilis Deus" that "the Blessed Virgin Mary was in the first instant of her conception, by a special grace and privilege of Almighty God, in view of the merits of Christ Jesus, the Savior of mankind, preserved free from all stain of original sin." In reply to an encyclical of the same pope, 1849, asking their views on the matter, all the bishops of the Church, with four exceptions, gave their adherence to the doctrine; thus showing that the formal definition five years later was the expression of Roman Catholic belief. The dogma is not formally expressed in Scripture; but according to the Church it is implied in those passages which declare Mary's office and prerogatives. Such are the salutation of the angel (Luke i, 28), the greeting of Elizabeth (*ibid.*, 42), and especially the Protevangelium (Gen. iii, 15).

Im'mermann, Karl Leberecht, 1796–1840; German dramatist and humorist; b. Magdeburg; after holding a government office in his native city, removed to Münster, 1823, and to Düsseldorf, 1827; managed the theater of Düsseldorf, 1834-38; works include the comedies "The Eye of Love" and "The Princes of Syracuse," the tragedies "Alexis" and "Giamonda," and the romance "Münchhausen."

Immigra'tion, act of passing or coming into a country of which one is not a native for the purpose of permanent residence. Great Britain has suffered from the influx of undesirable aliens who take advantage of her time-honored policy of offering the freedom of her shores to the oppressed of all nations, and measures of restriction have been made the subject of parliamentary inquiry; but it is in the U. S. that the question is of extraordinary importance, and for that reason the present article will confine itself to immigration to the U. S.

Prior to 1820 no official returns were made of the arrival of foreigners, but estimates place the number at 250,000. In the decade ending 1850 the number of aliens arriving was 1,713,215; in the decade ending 1860 the number settling in the U. S. was 2,598,214; in the year 1890, 455,302, of whom 122,754 were from the United Kingdom, 92,427 from Germany, 56,199 from Austria-Hungary, and 52,003 from Italy. In 1900 the total number was 448,572, of whom 114,847 came from Austria-Hungary, 100,135 from Italy, 90,787 from Russia, 48,237 from the United Kingdom, 18,650 from Sweden, and 18,507 from Germany. For the fiscal year ending June 30, 1909, the immigrants admitted numbered 751,786, of which 170,191 were from Austria-Hungary, 120,460 from Russia, 183,218 from Italy, 71,826 from the United Kingdom, 25,540 from Germany, and 14,474 from Sweden.

In 1882 Congress passed an act whose principal provisions are: Sec. 1. A duty of fifty cents shall be levied on every passenger not a citizen of the U. S. from a foreign port. It shall be paid into the Treasury, and shall be known as the "immigrant fund" for the care of distressed immigrants. Sec. 2. All passengers shall be examined, and convicts, lunatics, idiots, paupers, and persons likely to become a public charge shall not be allowed to land. Sec. 3. Foreign convicts shall be returned to the country whence they came, and expense shall be borne by the owners of the vessels in which they came. In 1885 Congress passed the Alien Contract Labor Law. Its chief provisions were that prepayment of, or assisting foreign emigrants under contract for labor or service made previous to emigration, is unlawful; that such contracts are void; that the penalty for violation of this act is $1,000 for each person participating in such contracts. Foreigners temporarily residing in the U. S. may engage other foreigners, as servants, private secretaries, or domestics. Skilled workmen may be engaged for a new industry not yet established in the U. S. This act does not apply to professional actors, artists, lecturers, singers, or personal servants. Nor does it apply to individuals assisting relatives and friends to emigrate to the U. S.

In 1891 Congress passed an act "in amendment to the various acts relative to immigration and the importation of aliens under contract or agreement to perform labor." Its chief provisions are that the following classes of aliens are excluded: Idiots, insane persons, paupers, or persons likely to become a public charge; persons suffering from a loathsome or a dangerous contagious disease; persons who have been convicted of a felony or other infamous crime or misdemeanor involving moral turpitude, polygamists, and assisted immigrants, unless it is affirmatively or satisfactorily shown on special inquiry that such person does not belong to one of the foregoing excluded classes or to the class of contract laborers excluded by the act of February 26, 1885; but persons may send for relatives or friends who are not of the excluded classes; and political offenders are not excluded. The act of 1885 is amended by including among the excepted classes "minister of any religious denominations, persons belonging to any recognized profession, and professors for colleges and seminaries." By the provisions of this act the inspection of immigration came under Federal control. In spite of these laws

the fact still stands that throughout the U. S. thousands of paupers are found who were landed only a few years or a few months ago. It has been shown that societies have existed, and still do exist, in Europe, for the avowed purpose of assisting paupers and criminals to emigrate.

In 1869 a treaty was ratified between the U. S. and China, which is known as the Burlingame Treaty. By Article 5 the right was conferred on all Chinese subjects to emigrate to the U. S. either for the purpose of curiosity, or trade, or for permanent residence. Article 6 conferred a similar right on citizens of the U. S. in respect to Chinese territory, but at places only where foreigners were permitted to reside. In the decade from 1840–50 the number of Chinese immigrants was 35; 1850–60, 41,397; 1860–70, 68,059; 1870–80 it had risen to 122,436; and 1880–90, in spite of restrictive laws, the reported immigration of Chinese was 59,995, and the actual immigration probably much larger. In the period 1896–1903, 16,099 Chinese were admitted. In 1904, 4,309; in 1908, 1,397. The practical effect of the Burlingame Treaty was one sided. While very few citizens of the U. S. desired to become permanent residents of China, vast hordes of Chinese were brought into the U. S. and thrown into competition with home labor. It was charged that they were coolies, who were brought here under contract for a term of years by the Six Companies; that their labor was controlled by these companies, and that their coming here was not voluntary, and that many were detained here until their contract term expired.

Appeals for relief were made by citizens of the Pacific coast. A congressional committee which investigated the subject reported that "the Chinese are nonassimilative with the whites, that they work for wages that will not support white men, that their only purpose is to acquire what is a competence in China and return there to enjoy it." Congress thereupon passed an act, May 6, 1882, by which the coming in of Chinese laborers who have never been in the U. S. is prohibited for ten years. Notwithstanding these laws, it was found that the flood of Chinese immigration continued, a very large portion of the influx being ascribed to the fraudulent use of return certificates. Congress on October 3, 1888, passed the "Scott Act," whose chief provisions are that it shall be unlawful for any Chinese laborer, who shall at any time heretofore have been, or who may now or hereafter be, a resident within the U. S., and who shall have departed or shall depart therefrom, and shall not have returned before the passage of this act, to return to or remain in the U. S.; and that no certificates shall be issued, and all previous certificates are void. Thus by this act certificates are not issued, and all Chinese laborers who have been here and have departed are prohibited from returning; while by the act of May 6, 1882, the coming in of Chinese laborers who have never been here is prohibited for ten years. These two acts, then, working together, form the total exclusion act of Chinese laborers.

The justification of the acts is sought in the U. S. Constitution, which provides that when the welfare of the country demands that any existing treaty shall be repealed, it is the duty of Congress to pass laws to that effect. It would be a crime to do otherwise. Such action is not a *casus belli*, but may furnish ground for retaliation. On April 4, 1892, the House passed the Geary bill, a severe measure directed against all Chinese. This was rejected by the Senate, and the question was then sent to conference; as a result of which conference the following law was passed May 5, 1892:

"An act to prohibit the coming of Chinese persons into the U. S." Sec. 1. All laws now in force prohibiting and regulating the coming into this country of Chinese persons and persons of Chinese descent are hereby continued in force for a period of ten years from the passage of this act. Sec. 2. Chinese persons unlawfully in the U. S. shall be removed. Sec. 4. Chinese persons convicted of being unlawfully in the U. S. shall be imprisoned at hard labor for a period not exceeding one year, and thereafter removed from the U. S. Sec. 5. No bail shall be allowed to Chinese persons, on application for a writ of *habeas corpus*, when such person has been denied a landing in U. S. Sec. 6. Chinese laborers must secure certificates of residence. Failure to do this within a year shall constitute evidence that he is unlawfully in the U. S.

In 1907 the exclusion law was modified, and it was made unlawful for teachers, students, merchants, accountants, bookkeepers, members of a learned profession, editor or traveler to work for gain as a laborer after entering the U. S. All others must apply within a year for a certificate of residence. They may depart at any time, through an established port for the entry of Chinese, and may return at any time, but through the same port after identification. See EMIGRATION.

Immortal'ity, the doctrine that the human soul is imperishable, being separable from the body at death and destined to a conscious life beyond the grave. The belief in a future life is almost universally prevalent. Egypt was the country where the greatest stress was laid upon the doctrine of immortality. The soul's cycle was set at 3,000 years, after which it returned to the body. Hence the care with which the body was embalmed, and the elaborate tombs such as the pyramids.

The proofs of immortality are numerous and of varying degrees of strictness. Among those most relied upon by the popular mind are: 1. The return or resurrection from the dead. 2. General belief in the existence of the soul after death; probability that such general beliefs of mankind are well founded. 3. General desire of man to live forever, and his horror at annihilation. 4. The infinite perfectibility of the human mind, never reaching its full capacity in this life; and the fact that it is contrary to the course of nature or to the Divine character to endow a being with capacities never to be developed. 5. The fact that perfect justice is not dispensed in this life; the

IMMIGRATION INTO THE UNITED STATES.

1. COMPARATIVE IMMIGRATION FROM VARIOUS COUNTRIES, 1908.

2. GROWTH OF IMMIGRATION BY DECADES.

uffer, and the wicked triumph; necessity ure retribution to justify God's govern-
The metaphysical doctrine of immortal-cludes various positions, favorable and orable, the most important of which are llowing: 1. The highest principle is re-l as indeterminate—pantheism; con-ness considered to be a disease or evil ich death or unconsciousness (Nirvana) cure. 2. Highest principle a rational in-nce—monotheism; the soul a transient ation which vanishes in death. 3. The eld to have preëxisted in an intelligible and to have come hither through a lapse oliness or for necessary experience; death s the imprisoned soul, and it rejoins its state or enters a new body (emanation —Plato). 4. Aristotle's doctrine of the reason as an unconditioned energy, im-able, while the lower faculties of the such as sensation, imagination, feeling, y, etc., are perishable.
itualism, or spiritism, has recently taken n a vast number of minds, and led to an cal doctrine of immortality. Recently vestigations of the Society for Psychical ch (Great Britain and the U. S.) have ed a mass of evidence concerning ghost and have done much to establish ght reading" as a typical fact that fur-the key to this class of phenomena. But gations in hypnotism have done most to light on apparent or real manifestations l as separate from the body. See FU-STATE; RESURRECTION; SOUL.

ortelles', name given by the French to flowers which from their papery nature wither on drying, known in the U. S. erlasting flowers," and are furnished by in widely different families. The im-

IMMORTELLES.

le so largely used by the French, made wreaths, crosses, and other designs, for rnment of churches and cemeteries, is *ysum orientale*, a perennial composite he island of Crete, of which large quan-are raised in the S. of France. There are several annual species and varieties of *helichrysum*, with much larger flowers and of various colors, that are common in American gardens, where they are cultivated for making winter bouquets.

Immune', in medicine, a person free from liability to disease. It has long been known that in the case of a number of acute infectious diseases—for example, smallpox—one attack of the disease preserves the individual from any future attack. In almost all of the infectious diseases, as measles, scarlet fever, typhoid, varicella, diphtheria, the same holds true. Certain races also show an immunity against certain diseases often without having previously been affected by them. There are various other influences affecting immunity; thus age, and to a certain degree sex, has an influence. Individuals who have passed a certain age possess a relative or absolute immunity to diseases of earlier life. It was first found in studying smallpox that immunity might be produced by inoculation of the body with a very similar disease of cows, cowpox. With the advance which has taken place in the study of the agents of infectious disease, it was found that, by altering in various ways the conditions under which certain infectious bacteria grew, they could be so modified that inoculation with them produced a milder form of disease, which conferred immunity from the virulent form of the disease in the same way that cowpox conferred an immunity against smallpox. This was first definitely proven by Pasteur in the case of anthrax, which is a peculiarly virulent disease of cattle. The immunity acquired by inoculation with the blood of an animal treated with diphtheria has had an important effect in reducing the mortality in that disease.

Imola (ē'mō-lä), town in the province of Bologna, Italy, on the Saterno, about 20 m. ESE. of the city of Bologna; was enlarged and embellished, if not actually founded, by the dictator Sulla, who sent a colony here abt. 80 B.C., and throughout the Roman period it was a town of some importance. Cato had a villa here. During the Middle Ages it was claimed by the See of Rome as a part of the gift of Constantine, but was subject to frequent assaults and occupations by the rival powers that then divided the Peninsula. From the time of Julius II it formed a part of the Roman states, except when held for a short time by the French, 1797, until the whole papal territory was annexed to the new Kingdom of Italy. The town is well built, and surrounded by its old walls with towers and trench, and has a cathedral, a castle, several palaces, a gymnasium, a technical school, a school of music, a public library, a hospital, and a corn exchange. Its manufactures, leather, wax, glass, majolica, silk, and hempen stuffs, are very considerable. A choice wine called *vino santo* is made here. Pop. of commune (1901) 33,210.

Impale'ment, or Empale'ment, form of capital punishment by means of a stake thrust through the body. The victim was often raised up from the earth, and one end of the stake was driven into the ground; hence the Greeks applied the name stake punishment to cruci-

fixion as well as impalement. Impalement is still practiced in half-civilized and barbarous countries. The driving of a stake through the heart of a suicide and his burial under the crossroads arose, it is believed, from a fear that his spirit would otherwise walk and frighten the living.

Impana'tion, term belonging to the eucharistic controversy, invented soon after, and in opposition to, that of *transubstantiation.* It was intended to express the consubstantiation, or intimate union of the blessed body and blood with the consecrated elements, without a destruction of the bread and wine.

Impatiens (īm-pā'shī-ēnz), genus of upward of 200 species of herbs (or undershrubs) belonging to the geranium family. They are natives of Europe, Asia, Africa, and N. America. The seed pods at maturity burst violently on being touched, hence the common name "touch-me-not." Two species occur in N. America—the pale touch-me-not and the spotted touch-me-not. The garden touch-me-not, or, as it is more commonly called, the balsam, is *Impatiens balsamina* from tropical Asia. Touch-me-nots are interesting on account of forming their flowers in such a way that they have to twist upon their stems in order to assume the proper position for insect visitation. In other words, the flowers when in bloom are structurally upside down.

Impeach'ment, accusation and prosecution, in a legislative body, of a person for high crimes. In England any member of the House of Commons may impeach any other member, or any lord of Parliament or officer of the realm. The House of Commons may then exhibit articles of impeachment before the House of Lords, and appoint managers to conduct the trial. This solemn procedure has been most frequently used against the king's ministers. In the U. S., impeachment is a written charge and accusation by the House of Representatives of the U. S. made to the Senate of the U. S.; in a state, it is such an accusation of an officer by the representatives before the Senate. Under the Federal Constitution the House has the sole power of impeachment, and the Senate the sole power to try all impeachments, while the persons liable to impeachment are the President, Vice President, and all civil officers of the U. S. The offenses for which one may be impeached are "treason, bribery, and other high crimes and misdemeanors." No person can be convicted without the concurrence of two thirds of the members. The most noted cases of impeachment are those of Warren Hastings (1788) and Lord Melville (1806) in England, and Judge Samuel Chase (1804) and President Andrew Johnson (1868) in the U. S.

Impenetrabil'ity, one of the essential properties of matter, implying that no two bodies can occupy the same portion of space in the same instant of time.

Impen'nates, or **Impen'nes,** name of a tribe of swimming birds having short wings covered with feathers resembling scales; the penguin (*Aptenodytes*) and the great auk (*Alca impennis*) are examples of this group.

Impera'tor, one who enjoyed the *imperium* (authority) appertaining to the higher offices of the Roman state, such as that of prætor, consul, or dictator. During the entire existence of the Roman Republic, of which the forms were preserved for hundreds of years after the republican spirit had disappeared before the encroachment of centralization combined with universal dominion, the title *imperator* had a meaning very different from that of the Byzantine, the mediæval, or the modern term "emperor." Originally of purely military application, it meant nearly the same as "captain" or "general," and the soldiers who on the battle field acclaimed their leader *imperator* meant only to express their belief that he was worthy to exercise command. The concentration of power in the hands of Augustus and his successors, with which their title of *imperator* is popularly associated, was exercised not by virtue of that title, but by accumulating in the hands of a single individual the additional offices of consul, proconsul, tribune, pontifex maximus, and censor; the attribution of all these powers to an *imperator* is a later idea.

Imper'fect, in music, a term indicating deficiency or a want of completeness or finality. An imperfect interval is one which is a semitone less than the perfect. Thus the interval B—F is an imperfect fifth; but by the addition of a semitone to either the higher or lower term—*i.e.*, by flattening B or sharpening F—the interval becomes perfect. An imperfect chord is one in which some of its intervals are wanting; as when, in a chord of the seventh, we occasionally omit the third or the fifth. The imperfect cadence (or half cadence) is that in which the harmony of the tonic triad is followed by that of the dominant, being the exact contrary of the perfect cadence.

Impe'rialism, originally the policy of an empire, absolute power being vested in a single ruler. It now also denotes the policy of the more powerful nations to acquire foreign territory, and consequently their assumption of rank as "world powers." In the presidential campaign of 1900 the policy of the U. S. as to the possessions ceded by Spain, especially the Philippines, was made a party issue, those opposing the acquisition being dubbed "anti-imperialists." In England the party favoring imperial federation are nicknamed "jingoes," and their opponents are "Little Englanders." See ANNEXATION.

Im'ports. See COMMERCE.

Im'post. See ARCH.

Impres'sionism, in painting, one of the forms of realism in art; the practice of representing the effects of nature on the artist's eye, without analysis of their causes, and without the observance of rules or traditions; especially, since abt. 1875, the work of a small body of French artists and their followers in other countries, who have been called *Impressionists.* The leaders of this movement are probably Édouard Manet, Claude Monet, and Auguste Renoir, though some critics would add to these the name of J. F. Raffaelli; others are Camille Pissaro, Paul Signac, Sisley, Caillebotte, Bes-

nard, and two ladies named Berthe Morizot and Marie Cassatt. In their pictures the effect of color in strong daylight is one of the important things. What we call green when seen under sunshine appears not as green but as yellow; the shadows cast upon snow by sunshine are almost pure blue; a white dress seen in the shade of trees on a bright day has a violet or lilac tone. These impressions are reproduced by the painter. The work of the impressionists is sure to seem very incomplete to the spectator who is not especially interested in painting, and generally seems sketchy and a mere memorandum of one or a very few observations, but it excites great interest among students of graphic art, and can hardly fail to exert influence on future painting.

Impress'ment, in English law, the forcible levying of mariners in time of war for the sovereign's service at sea. It was formerly the usual method of manning the British navy, and a similar procedure was employed by other maritime powers. The power of impressment was a branch of the royal prerogative, first mentioned in the Statute 2, Richard II, chap. 4, as a recognized usage. Many acts of Parliament from the time of Queen Mary down to George III regulated the system of impressment and exempted certain classes of mariners. The mariners were seized by an officer acting under an impress warrant, and having under his orders an armed party of picked men (the press gang), with which he visited the usual haunts of seamen and violently seized the most robust men, not without frequent and bloody struggles. A merchant vessel or a privateer was also liable to be so depleted of sailors by any man-of-war as to be crippled for all practical purposes. The impressment of American sailors was an abuse practiced for several years by Great Britain during the great continental war against the French Empire, notwithstanding the constant and earnest protest of the U. S. Govt.; and this finally became the immediate cause of the War of 1812 between the two countries.

Impris'onment. See PRISON.

In'achus, in Greek mythology, son of Oceanus and Tethys; the god of the river Inachus in Argos, who in the dispute between Poseidon and Here about the possession of Argos decided in favor of the latter, and hence was deprived of his water by Poseidon and made dry except in the rainy season. Being a river god, he was reckoned as the first King of Argos, who, after the flood of Deucalion, led the Argives from the mountains into the plains; hence Argos is often called Inachian. He was the father of Io, and through her the progenitor of the royal families of Egypt, Phœnicia, Crete, Thebes, and Argos.

Inagua (ē-nä'gwä). Great, largest of the Bahama Islands; 54 m. NE. of the E. extremity of Cuba; is irregular in shape, 50 m. long from ENE. to WSW., and 25 m. in greatest width; area, 665 sq. m. Pop. (1908) 1,453. The island is nowhere more than 150 ft. high, and is surrounded by reefs which make navigation dangerous. The land affords good pasturage, and in the interior there is a salt lake which has been utilized for the manufacture of salt. The principal village is Matthew Town. Little Inagua (8 m. by 6), 12 m. to the N., has a few inhabitants.

Inani'tion. See STARVATION.

Incandes'cent Light. See ELECTRIC LIGHTING.

Incanta'tion, form of magic once of universal acceptance, used not only by the barbarous but by the civilized peoples of the Old World, Egyptians, Babylonians, Hindus, Greeks, and all others, nor is its use even yet entirely extinct among the descendants of these peoples. It was much believed in during the Middle Ages by all Germanic and many other nations, and some remnants of it are still extant in certain popular superstitions in England, Scandinavia, and Germany. It consisted in chanting or solemn recitation or mystical murmuring of certain phrases, generally of no meaning, but of a striking rhythm. In the mouths of certain persons these phrases had the power of killing or curing a man, of blessing or blasting a field, of raising or laying a storm; or they could compel the spirits of the elements, or even the spirits of the dead, to appear and make revelations. The incantations in "Macbeth" and "Faust" give a very vivid picture of this kind of magic. See MAGIC.

Incar'nate Word, La'dies of the, congregation of nuns founded 1625 by Jeanne Marie Chesard de Matel (1596–1670), approved by the pope, 1633. Their work was at first one of instruction, but, 1866, they assumed the care of hospitals. They have several houses in Texas.

Incarna'tion, term applied generally to the presence of deity in a material form, such as the nine incarnations of Vishnu. In Christian theology it refers to the union of God and man in the person of Christ, because of God's love for man, and will to save him from the worst consequences of sin (John iii, 16), his desire to raise human nature by joining the divine nature to it, and to show mankind "a perfect and exalted model of human excellence." That Christ might be given to the world two principles were united—the Holy Ghost from heaven, the Virgin Mary on earth (Luke i, 35). Through his conception by the Spirit he was entirely holy, "perfect God"; through his human birth he had capability for all human infirmities except sin, was "perfect man," possessing a "reasonable soul." No dogma has caused more dissension in the Christian Church. Among its early opposers were the Sabellians; the Samosatenes, followers of Paul of Samosata; the Origenists, the Manichæans, and, most important of all, the Arians in the fourth century. In the fifth century arose the sect of Eutychians, who, while acknowledging Christ's Godhead, denied his assumption of humanity. In modern times the mere manhood of Christ is asserted principally by the Unitarians. See also ARIANISM; UNITARIANISM.

In'cas, reigning aristocratic and sacerdotal caste in ancient Peru. It has been supposed that the Incas were originally a small gens

of the Quichua race near Cuzco, but this cannot be known positively. According to the Quichua traditions all the Incas were descendants of Manco Capac and his sister and wife, Mama Ocllo Huaco. Like Romulus and the Greek heroes, this pair marks the boundary of what may be fairly regarded as legitimate history with the vague region of fable. The legends recount that they were children of the sun. After various wanderings they were miraculously directed to found the city of Cuzco, where Manco Capac instructed the surrounding Indians in the worship of the sun and showed them how to till the ground, while Mama Ocllo taught the women to spin and weave.

The Inca monarchy, unlike that of Mexico, was a substantial institution and not a mere loose conglomeration of tribes. Its form was remarkable, and there is no exact parallel to it in history. It may be regarded on the one hand as an exaggerated form of feudalism, and on the other as a system of state socialism under a despotic head.

The Inca was the absolute but, in most cases, kindly ruler; land was held by the state, portions being allotted to each family to cultivate under fixed rules. The most careful and systematic management, with irrigation on a vast scale, gave the greatest possible value to the ground; huge granaries were established for the use of the armies and to provide against poor years; rapid transfers of supplies were made to points where they were needed. For years after the Spanish conquest supplies were forwarded from these granaries to supply the peasants, and this without orders from their less civilized white rulers. The Incas built excellent roads, established rest houses for travelers, had a rapid and efficient post, and a well-organized army. All gold of right belonged to the ruler, and he decorated his palaces, and especially the temples, with magnificence. In many respects the Inca government will compare favorably with any which at that time existed in Europe.

In'cense, substance burned for the fragrance of its smoke, and used in the performance of a religious ceremony. The ancient Egyptian, the Hebrew, the Brahmanical, and other religious ceremonials made use of incense burning. The Roman Catholic Church and some of the Eastern churches use incense in their services. Various gums and spices are employed, but in the Roman Catholic Church olibanum is used, mixed with storax, cascarilla, and other ingredients. It is burned in a thurible or censer swung by chains.

Inch'bald, Elizabeth Simpson, 1753–1821; English actress and dramatic author; b. Stanningfield, Suffolk; married, 1772, the actor Inchbald, and went on the stage the same year; acted in London and other English cities with considerable success, but retired from the stage, 1789, and devoted herself to literary pursuits. She translated a great number of dramas from the French and German, and published "The British Theater," a collection of dramas in twenty-five volumes (1806–09); "The Modern Theater," a collection in ten volumes (1809); and a collection of "Farces," in seven volumes. Her greatest success, however, was her romance in four volumes, "A Simple Story," published 1791, and translated into several languages.

Incinera'tion. See FUNERAL.

Inclined' Plane, in mechanics, one of the so-called mechanical powers, or simple machines, by which a small force acting through a long distance is made to overcome a greater force acting through a shorter length of path. The wedge and the screw are particular instances of the application of this principle.

Inclined planes on canals are used for raising and lowering boats from one level to another, as substitutes for lift locks. The plane consists of an ordinary railway track laid on a graded plane leading from the lower to the higher level or pool to be connected. The track leads from the bottom of the lower pool along the plane, over, into, and down to the bottom of the upper pool. The boats are carried up or down the plane on wheeled carriages running on the railway track. The carriages are moved by an endless wire rope passing around large horizontal pulleys fixed at the head and foot of the planes in each pool, and attached to a winding drum operated by a turbine motor. The turbine is operated by water taken from the upper pool. The boats are received by being floated over the carriage in either level, and made fast thereto, and the machinery being put in motion the boat settles down upon the carriage as it rises along the plane, and is carried to the other level, where the carriage sinks to the bottom of the pool, the boat floats, is detached, and passes on its way. *Inclined planes on railways* are tracks built on grades so steep that ordinary locomotives cannot effect an ascent, where special devices, such as cables, rack rails, or gripping wheels are necessary. The popular terms, gravity roads, switchbacks, cable planes, and rack railways usually imply the existence of inclined planes.

The earliest method for operating a railway having such an incline was to pull up the cars by a rope or cable, the power being derived by a stationary engine at the top of the grade. The next method devised was a rack rail laid on the track having teeth into which engage cogs on the circumference of the driving wheel of the locomotive, this device thus furnishing the necessary adhesion. Another method is to gripe an endless moving cable by means of wheels on the cars, as in the cable system of street railways. A large number of inclined planes operated by cables in essentially the manner above described have been constructed in Europe and the U. S., principally for tourist and excursion travel. The track gauge is usually one meter in Europe and 3 ft. in the U. S. The maximum limit of grade appears to be reached at about sixty per cent. The rack-rail system of operating inclined planes consists in the use of locomotives having toothed wheels on the driving axle which engage with the teeth of rack rails laid on the track. The rack-rail systems may be divided into two classes—the Riggenbach and the Abt—so called from the names of the inventors of special forms of rails. The Riggenbach rail is similar to that first

used on Mt. Washington, being of the ladder type, or consisting of round bars fastened between the vertical sides of an iron trough. Of this class are the Righi road and others in Switzerland, the Drachenfels road on the Rhine, and a few in Austria and elsewhere. The Abt rail consists of two or more simple toothed bars placed side by side, and it is used on the Pilatus, the Pike's Peak, and the Mt. Desert railroads, as well as on many others.

In'come Tax, form of direct tax based on the actual annual income of individual citizens. Theoretically, it is the most equitable of all taxes, according most fully with the generally accepted maxim of Adam Smith that "the subjects of every state ought to contribute to the support of the government as nearly as possible in proportion to their respective abilities; that is, in proportion to the revenues which they respectively enjoy under the protection of the state." It would seem fairest that a small percentage should be levied on all incomes; but most advocates of this tax insist that incomes below a certain amount should go altogether untaxed, and that the percentage should be increased on the larger incomes. Usage has adopted these two features. The chief objection to an income tax is the difficulty, almost impossibility, of ascertaining men's real incomes; partly because many keep no accurate accounts, and partly because few, comparatively, will make truthful report of their incomes, and the inquisitorial nature of the tax is offensive. In the U. S. the Wilson Tariff Act of 1894 provided for an income tax of two per cent on all excess over $4,000. Arrangements were made for its collection, but doubt having been thrown on its constitutionality, a test case was submitted to the Supreme Court, who decided (five to four) that it was a direct tax and not apportioned to representation, and therefore unconstitutional and void. In 1909 Congress passed a constitutional amendment providing for an income tax. The amendment was passed on to the state legislatures for ratification. In Great Britain an income tax of one shilling (24c.) to every pound sterling ($4.87) produced a revenue of £31,600,000. Incomes up to £160 are exempt, and there is a twenty-five-per-cent rebate on earned incomes up to £2,050. See TAXATION.

Incuba'tion, process by which eggs are hatched. It consists essentially in keeping the eggs at a temperature of about 102° F. for a period which varies in the different species, though it is constant, or nearly so, in each. The heat necessary for the development of the young is usually supplied by the female bird, whose temperature during the period of incubation is considerably above the normal. The humming bird uses 12 days to hatch her young ones, the canary from 15 to 18, the common fowl 21, the duck from 28 to 30, the guinea fowl 28, the turkey 30, the swan from 40 to 45, etc. Incubators, as the devices for artificial hatching are called, have been in use from very early times. The modern incubator is a chamber of convenient size, carefully insulated from the outer air and provided with devices for supplying heat, air, and moisture to the eggs, which are placed in trays within the chamber and frequently turned. As the embryo within the eggs develops, heat is evolved, and the amount of extraneous heat necessary gradually decreases. See POULTRY.

Incum'brance, in law, a legal claim on an estate, for the discharge of which the estate is liable. The term is a general name for liabilities by which an estate in lands and hereditaments may be burdened, such as mortgages and annuities.

Incunab'ula, name given to books printed before 1500. They are important not only as illustrating the progress of printing, but also for artistic and scientific reasons. The number of such books is probably not far from 20,000. Most incunabula are rare books, eagerly sought after by collectors; some of them have, as *editiones principes* of Greek or Latin classics, also a considerable critical value.

Inden'ture. See DEED.

Independ'ents, (1) a politico-religious party in the time of the Commonwealth of England, composed of those Puritans who favored "the New England way" of church government—that of voluntary churches, self-governed under Christ, and mutually independent, yet bound to each other in relations of comity and mutual intercourse. Differing from the Presbyterians only on church government, they formed a small though able minority in the nation, as well as in the Assembly of Divines and in the Parliament. Politically they became a numerous and powerful party. The Baptists (or, as they were then called, the Anabaptists) were Independents religiously as well as politically. The Independents opposed not only monarchical rule, but also Presbyterianism, which was favored by the majority of the Puritan clergy, and they finally wrested the control of affairs in Parliament from the Presbyterians. They were responsible for the trial and condemnation to death of Charles I, and for the futile attempt to convert England into a republic.

(2) A religious body in Great Britain and Ireland holding that every stated congregation of Christian believers associated under a voluntary agreement, formal or informal, for Christian worship and for mutual watchfulness and helpfulness in the Christian life, is a complete church, invested with every prerogative which Christ has conferred on any church, and dependent for the exercise of ecclesiastical functions on no authority exterior to itself, whether secular or hierarchical. (See CONGREGATIONALISM.) The most considerable difference between Independency in England and Congregationalism in the U. S. is that in the former the principle of the fellowship and mutual responsibility of churches, though recognized, is not so fully developed and made practical as in the latter. The ecclesiastical history of England gives no definite trace of a church constituted on the platform of Independency earlier than 1567. The Independents, or "Separatists," as they were originally called, were also nicknamed "Brownists"—Robert Brown, a former clergyman of the Established Church,

who formed a kind of Congregational Church at Norwich, 1581, having been their most conspicuous leader. They were also called "Barrowists," from Henry Barrowe, another of their champions, who was one of their martyrs. At a later date (in the time of the Long Parliament) they began to be called Independents. By that name their successors have ordinarily been designated, though now they prefer to call themselves Congregationalists.

The Independents, or Congregationalists, in Great Britain and the British colonies are a numerous and enterprising body of Christians. There are in Great Britain and Ireland about 4,900 churches, chapels, and "mission stations"; 3,130 ministers, and about 479,100 communicants. The London Missionary Society, though not exclusively theirs, is the organization through which they conduct their foreign missions. They have a home missionary society for their work in England, and a colonial missionary society to aid their churches in the colonies. They raise for religious and philanthropic purposes upwards of $5,000,000 per annum. The Congregational Union of England and Wales, a federation of the churches, was formed 1831. Until late in the nineteenth century they were excluded from the universities. They have established colleges of their own for the classical and theological education of their ministers, and their colleges in England are now affiliated with the London Univ. Besides their other institutions, they have founded, at Oxford, Mansfield College, for the education of ministers, opened 1889.

Indeter'minate, in mathematics, a term applied to a quantity when it admits of an infinite number of values. An *equation* is said to be *indeterminate* when the unknown quantities that enter it admit of an infinite number of values. Thus the equation of a straight line $y = ax + b$ is indeterminate; for if we give to x any value, we can find from the equation a corresponding value of y such that the assumed and deduced values will satisfy the equation; that is, there are an infinite number of sets of values of x and y that will satisfy the given equation. It may be shown that any equation which contains more than one unknown quantity is indeterminate; it is obvious that any group of simultaneous equations is indeterminate when the group contains fewer equations than there are unknown quantities; hence the equations of lines and surfaces used in analytical geometry are indeterminate. For this reason analytical geometry is often called indeterminate geometry. A *problem* is said to be *indeterminate* when it admits of an infinite number of solutions.

Indeterminate Coeffi'cients: an *identical equation* is an equation that is true for all values of the unknown quantity or quantities that enter it. In every such equation the unknown quantity or quantities are indeterminate, and the coefficients of the different powers and combinations of powers of these quantities are called *indeterminate coefficients.* If an identical equation containing any number of unknown quantities is cleared of fractions, the coefficients of the like powers and combinations of powers in the two members are respectively equal to each other. This is *the principle of indeterminate coefficients*; it is much used in developing quantities into series and in resolving fractions into partial fractions.

In'dex Libro'rum, in general, list of books the reading or retaining of which is forbidden by authority; in the Roman Catholic Church the list of writings prohibited by the supreme authority as prejudicial to faith and good morals. This list or catalogue is twofold: that of books absolutely forbidden to be read, "Index Librorum Prohibitorum," and that of books forbidden only until they are expurgated or corrected by their author, "Index Librorum Expurgandorum." It is published by the "Congregation of the Index," composed of cardinals designated by the pope, with a secretary, who is by right a Dominican monk, and a body of examining theologians. The first Roman index with papal authorization (Paul IV) appeared 1559, and the "Tridentine Index," compiled by the Council of Trent and sanctioned by Pius IV, 1564. The Congregation has issued some forty editions of the index, adding at times new observations and instructions, or general decrees concerning books which are forbidden, though not mentioned in the index. In former times temporal sovereigns issued indexes. The first was that of Henry VIII, 1526, which was followed by that of Charles V, 1529, which formed later a part of the Louvain "Catalogue."

In'dia, empire belonging to the British crown, comprising all that part of the great triangular peninsula of India which is directly or indirectly under British rule, and Upper and Lower Burma. Nepal, Bhutan, Kashmir, Afghanistan, and Baluchistan owe varying degrees of allegiance to the empire. The name India is applied by geographers not only to India proper (Hither, or British India), but also to a group of countries lying E. of Burma —Siam, Annam, Cambodia, Cochin China, and Tonking—those forming what is called Farther India. Hindustan, a modern word applied by the Persians to India, is by Europeans applied properly to the N. central region only. India is bounded on the N. by the Himalayas, the loftiest mountains in the world; NW. by the highlands of Afghanistan and Baluchistan; NE. by part of Tibet, and a tangled knot of semi-independent country where the frontiers of Tibet, Burma, and China march together; on the E. by the Chinese provinces of Yunnan, the Shan States, and Siam. The W. and E. shores of the tongue of the peninsula are washed by the Arabian Sea and the Bay of Bengal respectively. British India, that part under direct British rule, is for purposes of administration divided into the provinces of Madras, Bombay, Bengal, E. Bengal and Assam, United Provinces of Agra and Oudh, the Punjab, Burma, Central Provinces, and NW. Frontier Province. The minor charges are Coorg, Ajmere-Mewara, British Baluchistan, and the Andawan Islands, each under a chief commissioner.

The total area of British India is 1,766,517 sq. m.; pop. (1901) 294,361,000. The feudatory or native states, more or less under control,

are Haidarabad, Baroda, Mysore, Kashmir, Rājputāna, Central India, Bombay States, Madras States, Central Provinces States, Bengal States, United Provinces States, Punjab States, and Baluchistan, E. Bengal, and Assam; area, 680,282 sq.m.; pop. (1901) 61,325,156. There are ten cities exceeding 200,000 in population: Calcutta, Bombay, Madras, Haidarabad, Lucknow, Rangoon, Benares, Delhi, Lahore, and Cawnpur. In the province of Bengal the population per sq. m. is 548; in British Baluchistan it is only 6.

The most important mountain ranges are the Himalayas, Vindhyas, E. and W. Ghats, and Anamullay Hills. The greatest rivers are the Ganges, Indus, Brahmaputra, Irawadi, each 1,000–2,000 m. in length. The Brahmaputra unites its delta with that of the Ganges, before reaching the Bay of Bengal; the Ganges is remarkable for the extensive system of artificial irrigation derived from it. The lakes of India are insignificant, with the exception of the salt lake at Sambhur. The most important harbors are Karachi, Bombay, and Cochin on the W. coast, and Madras on the E. Calcutta, the capital and the winter seat of the supreme government, as well as that of Bengal, lies 80 m. up the Hugli River.

The three very distinct types of climate of India are: The damp and uniform, but moderate warmth characteristic of equatorial regions; the annual alternation of extreme heat with positive cold, the dry atmosphere, and rare and scanty rainfall; and lastly the perpetual damp and frequent and heavy rainfall. It is excessively hot during the greater part of the year on the great plains, where the chief cities are situated, the mercury frequently rising to 100° and 110° F. The winds, called monsoons, which blow half the year from the SW. and the other half from the NE., bring rain respectively from the Indian Ocean between June and September, and from the Bay of Bengal between October and December. In some districts the rainfall is extraordinary. India is not rich in metallic minerals. Few countries, however, have a more abundant supply of pure iron ores. Agates and jaspers, jade, rubies, and sapphires are found in some localities. The diamonds of India maintain their preëminence for purity. Gold and silver are found in limited quantities in Mysore. Immense deposits of rock salt are worked in the Punjab. Rangoon oil has long been an article of commerce, and petroleum is also found.

The vegetation varies with the elevation, corresponding closely with that of Europe in the mountain regions of the N., where are extensive coniferous forests. Below these are tracts of bamboo, and the valuable saul timber tree (*Shorea robusta*) also occurs. Teak forests cover a large area in Central India, and the deodar tree affords an important supply of timber in the United Provinces of Agra and Oudh. The Indian Govt. maintains a thorough system of forest conservancy. Of cereals, rice is the staple product on the plains, which also yield cotton, sugar cane, indigo, jute, and opium. Other productions are tea, tobacco, maize, millet, peas, beans, and many peculiar varieties of grain, wheat, and barley on the higher grounds, pepper in Malabar, and coffee among the hills of S. India. The fruits of the temperate zone grow in the elevated regions, and those of the tropics in the lower part of the country. The fauna of India includes the tiger and leopard, the Indian elephant, antelopes, deer, monkeys, bears, wild boars, foxes and squirrels, and the striped hyena. Many of the birds have most gorgeous plumage. Dangerous reptiles abound, and among them the dreaded cobra de capello. Crocodiles haunt the rivers in great numbers, and fish are plentiful.

The chief articles of import are cotton manufactures, metals, hardware and cutlery, silk, raw and manufactured; sugar, machinery and mill work, woolen goods, liquors, oils, provisions, chemicals and drugs, and apparel; chief articles of export, cotton, raw and manufactured; jute, raw and manufactured; rice, hides and skins, opium, and tea. The value of imports (1908) $442,847,000; that of exports, $562,820,000. The great bulk is interchanged with Great Britain and Ireland, while Hongkong and the treaty ports of China rank next, after which come France, Germany, the Straits Settlements, Belgium, and the U. S., in the order named. There are some 28,221 m. of railway in operation and 61,864 m. of telegraph lines. The Ganges Canal and its branches, and the irrigation works in the deltas of the Mahanadi, the Godavari, the Kistna, and the Cavery are among the greatest achievements of their class in the world. There is a valuable network of canals also in the parched Sind desert, and besides these protections against the disasters of famine may be mentioned artificial lakes, tanks, and wells for irrigation scattered throughout the country.

The supreme executive authority in India is invested in the governor general in council, who since 1858 has also been viceroy. He is appointed by the crown and usually holds office for five years. His council consists of six ordinary members, besides the commander in chief. For legislative purposes the council is expanded into a legislative council by the addition of sixteen members, who are nominated by the viceroy. The lieutenant governor is also an additional member when the council sits in his province. The governors of Madras and Bombay are appointed by the crown. The other divisions are under lieutenant governors, who have legislative councils of their own. Each province is usually broken up into divisions under commissioners, and then divided into districts, which form the units of administration. One third of the country still remains in the hands of its hereditary rulers. Their subjects make about one fifth of the whole Indian people. The native princes govern these states with the help of British residents or agents appointed to their courts by the viceroy. The chiefs form a body of feudatory rulers possessed of revenues and armies of their own. They are, however, forbidden to make war on one another or to have any separate relations with foreign states.

The inhabitants of India, of whom the British-born numbered only 96,653 in 1901, represent a variety of races. The Aryans, who appear to have entered by way of the Kabul

River, or Upper Indus, had by the fourth century B.C. spread to the Gangetic delta, and had divided into three classes: (1) the priests or Brahmans (2) the warriors or king's companions, called at the present day Rajputs; (3) the husbandmen or agricultural settlers, who retained the old name of Waisyas. A fourth or servile class, called Sudras, were distinguished from their Aryan conquerors as being "once-born" instead of "twice-born." These divisions gradually developed into castes. The great mixed population known as the Hindus has grown out of the Aryan and Non-Aryan elements. The last of all to come were the Mohammedans. There are remnants of black-skinned aboriginal races in the Anawali Hills, the Central Provinces, and in the tributary State of Orissa, and aboriginal races in the plains. The principal languages are the Hindi, Bengali, Telegu, Mahrathi, Punjabi, and Tamil. The prevailing religion is the Hindu, followed by the Mohammedan, the Buddhist (mostly in Burma), Jain, Parsi, and the Christian, the latter in half represented by Roman Catholics.

Each township or village manages its own internal affairs under a system which originated in remote antiquity. Cultivation is laboriously pursued with implements usually of a rude kind. The country is peculiarly subject to pestilence and famine, the spread of disease being facilitated by the congregation of the people on long pilgrimages. Architecture is the only one of the fine arts in which the natives have obtained much eminence. Noteworthy monuments, mosques, palaces, etc., are found at Ajmeer, Agra, Delhi, and Lucknow. The vast majority of the people derive their livelihood from the land. Silk, cotton, woolen, and jute goods are the leading manufactures. The weaving of carpets and rugs is an important industry. The embroidered muslins of Dacca, Patria, and Delhi are well known. A system of education, providing instruction for all classes, has been in process of development since 1854. There are universities at Calcutta, Madras, Bombay, Allahabad, and the Punjab; also middle and primary schools. Normal schools exist in every province. Several of the principal cities have schools of medicine, civil engineering, and art, and there is a considerable number of museums and scientific and literary societies.

In literature, the venerable Sanskrit epic of the "Mahâbhârata" ranks first, as the traditionary legend dates its compilations by a sage, Vyasa, some 5,000 years back. It has been described as a cyclopedia of Indian mythology and legendary lore, extending over eighteen books and 220,000 lines. The second great epic, the "Râmâyana," recounts the advance of the Aryans into S. India. Unlike the "Mahâbhârata," it is ascribed to a single poet named Valmiki. The name of Kalidasa has come down as the composer of two later epics and also as the father of the Sanskrit drama, a class of works which probably belongs to the period between the first century B.C. and the eighth century A.D. Kalidasa's most famous drama is "Sakuntalâ," or "The Lost Ring." There are others of the Hindu dramas and domestic poems of almost equal interest and beauty. The "Upanishadas," the "Purânas," and "Tantras" mark various epochs in the development of Hinduism. The "Purânas," which recount the deeds of the Brahman gods, belong to the period after the mass of the people had split up into their two existing divisions as worshipers of Vishnu or of Siva, after 700 A.D. While claiming to be founded in Vedic inspiration, they practically superseded the Veda, and have formed during ten centuries the sacred literature on which Hinduism rests. An idea of the literary activity of the Indian mind may be found from perusal of the annual lists of the publications issued in the different provinces. These are combined into an annual review printed in Calcutta. A vernacular literature of provinces and elementary works, also of more advanced works, chiefly translations, has sprung up, great numbers of such books appearing annually. There is an influential native press.

From the Aryan invasion sprang the Hindu or Vedic system of religion, which was reformed by Buddhism some five or six centuries B.C. Then came the invasion under Alexander the Great and some of his successors into the NW. part of the country. Buddhism as a state religion obtained the sovereignty over the whole country, but some five centuries after the Christian era gave way to the old Hindu system, revived under an elaborated form and styled Brahmanism, which represents the modern Hinduism; flourished till the eleventh century A.D., when the first Mohammedan invasion took place under Mahmud of Ghazni. The most important Mohammedan dynasty, the Mogul, lasting for two centuries, was overthrown by the Mahrattas, who brought about a revival of Hindu power in the seventeenth century. Meanwhile European influence was beginning to be felt. The Dutch had several settlements; the Portuguese, after the discoveries of Vasco da Gama, controlled the W. coast, excepting Bombay.

The British began to be a dominating influence from Clive's victory, 1757, over the Mogul at Plassey, which gave to Great Britain the possession of Bengal and Behar. Sixty years later, when Poona fell to the British, the East India Company was the master of India as far as the Indus basin, but not in the Punjab or Sind. The great Mogul, now powerless, was under its protection at Delhi. The company had restored a Hindu sovereign to Mysore, and the two Mohammedan states of Oudh and Haidarabad (Deccan) were its honored though dependent allies, while other native states were maintained in the same position. The dominion founded by Clive was preserved through critical times by Warren Hastings, extended by Cornwallis, and still further advanced by Wellesley and the Marquis of Hastings. The first Burmese War occurred under Lord Amherst, but it was not till Lord Dalhousie's viceroyalty, 1852, that British rule was extended over the important province of Pegu. The first Afghan War, 1838, was undertaken with the object of setting up a native sovereign in Afghanistan under British protection as a means of guarding the NW. frontier. Through mis-

management disaster ensued, but it was amply avenged by the campaign of Gen. Pollock in the same year, after which the British troops evacuated Afghanistan. Sind, the Punjab, and Lower Burma were the next acquisitions. A mutiny of the Bengal army broke out, 1857, shortly after Dalhousie had handed over the governor generalship to Canning. Terrible massacres of Europeans occurred at Meerut, Cawnpur, and elsewhere. Delhi was besieged for three months. There were risings in many parts of the country, and from 80,000 to 90,000 soldiers were in revolt, but the principal native princes set an example of loyalty to the supreme power, and within six months after the outbreak the imperial danger was surmounted and the rebellion soon afterwards crushed. The cost increased the public debt by £40,000,000.

As a result of the mutiny the East India Company ceased to exist, and on November 1, 1858, the queen assumed the government of India, and in 1877 was proclaimed Empress of India. A serious war ensued, 1878, against Sher Ali, Amir of Afghanistan, who had favored Russian intrigues and excluded a friendly British mission. The country fell to the British arms, and a treaty of peace was concluded with Sher Ali's successor. Within a few months, however, the British resident at Kabul, Sir Louis Cavagnari, was treacherously murdered, and a second war became necessary. The country was not reconquered without some reverses. A movement among the educated classes of all races, religions, and provinces, to meet together and discuss their political wants, resulted in the holding, 1885, of the first Indian National Congress, at Bombay. The twenty-first congress was held at Benares, 1905.

India (or **Chi'na**) **Ink**, a pigment of two kinds: (1) The dried pigment from certain cuttlefishes. When browned by the action of an alkali it becomes *sepia*. It is prepared in Italy, in Turkey, and in Asia. (2) A mixture of fine lampblack with glue or size and a little camphor. It is prepared in China, and is a very useful pigment. Both kinds are used in Asia as writing inks, and both are practically indelible.

Indian'a, popular name, HOOSIER STATE; state flower, corn; state in the N. central division of the N. American union; bounded N. by Lake Michigan and the State of Michigan; E. by Ohio; SE. by Kentucky; W. by Illinois; area, 36,350 sq. m.; pop. (1900) 2,516,462; capital, Indianapolis. The surface is an undulating plain, sloping gently toward the SW.; elevation in the NE. about 1,100 ft.; in the SE. about 500 ft.; surface toward the S. broken by "The Knobs," a range of rocky hills extending from the Ohio in Floyd and Clarke cos. N. and NW. into Parke Co.; greater part of the state drained by the Wabash, White, and White Water rivers; important branches of the Wabash, the Tippecanoe, and Eel rivers, Salamonie, Mississinewa, Wild Cat, Sugar, and Big Raccoon creeks; mineral products coal (mostly block and bituminous; the area covering 6,500 sq. m.), limestone, sandstone, shale, porcelain and pottery clays, brick and tile clays, glass sand, clay, iron ore, petroleum oil, natural gas; total value of products (1907) $39,141,217, including coal, $15,114,300; petroleum, $4,536,930. Soil in the N. composed entirely of drift materials, but toward the S. rich and varied; chiefly limestones, shales, and sandstones; soil in general of bowlder clay, broken down and assorted by water into beds of sand and clay, mingled with vegetable mold; soils of the "bottoms" of the rivers and other streams of exceptional fertility; broad areas of prairies in the NW. and W. The chief crops (1908) were corn (137,835,000 bu.), wheat (45,169,000 bu.), oats, hay, and potatoes. The area under tobacco (1908) was

12,450 acres, yielding 8,715,000 lbs., valued at $1,045,000. The stock (1908) consisted of 814,000 horses, 660,000 milch cows, and 1,096,000 cattle, 1,215,000 sheep, and 3,159,000 swine. Average annual temperature of state 52° F., ranging from 48° in the N. to 56° in the S.; average annual rainfall about 42 in.; prevailing winds W.

The largest business factors next to the agricultural interests are coal, natural gas, timber, kaolin, clays, and building stone. Other large industries: slaughtering and meat packing, grist-mill products, distilled liquors, lumber and timber products, iron and steel, foundry and machine-shop products, glass, carriages and wagons, cars (construction and repairs by railroad companies), furniture, and agricultural implements; factory-system establishments (1905) 7,044; capital invested, $512,071,234; value of products, $393,954,405. Intercommunication (aside from the boat traffic of the Ohio River, and that of Michigan City, the only lake port, and the ordinary wagon roads) conducted entirely by railways. Leading religious denominations, Methodist Episcopal, Roman Catholic, Disciples of Christ, Baptist, United Brethren, Presbyterian. State educational institutions, a university at Bloomington, normal schools at Terre Haute and Indianapolis, a college of agricultural and mechanic arts at Lafayette; other institutions include De Pauw Univ. (Methodist Episcopal), Greencastle; Wabash College (nonsectarian), Crawfordsville; Univ. of Notre Dame (Roman

Catholic), Notre Dame; Vincennes Univ. (nonsectarian), Vincennes; Rose Polytechnic Institute, Terre Haute. State penal and reformatory institutions include—prison, Michigan City; reformatory, Jeffersonville; hospitals for the insane, Logansport, Richmond, Evansville, and Indianapolis; school for the deaf, dumb, and blind, Indianapolis; soldiers' orphans' home, Knightstown; soldiers' home, Lafayette. Principal cities, Indianapolis, Evansville, Fort Wayne, Terre Haute, South Bend, Muncie, New Albany, Anderson, Richmond.

Indiana originally formed a part of the French possessions, and, 1702, a number of immigrants settled at Vincennes and other trading points. In 1763 the territory was ceded to the English. By the treaty of 1783 the whole NW. Territory was transferred to the U. S. In 1788 an Indian war scourged the Vincennes colonists, but the natives were finally defeated 1791, by Gen. Wilkinson. In 1800 Ohio was cut off on the E., and all the country W. and N. became the Territory of Indiana. In 1805 Michigan Territory was set off, and in 1809 Illinois Territory, leaving Indiana Territory with its present boundaries. In 1811 occurred the fierce war with Tecumseh, which was brought to a close by the successful battle of Tippecanoe, under command of William Henry Harrison, the first territorial governor. On December 11, 1816, Indiana was admitted to the Union. An era of wild speculation followed extensive internal improvements, and, 1837, there was general bankruptcy and an enormous state debt ($14,057,000). In 1846 prosperity began to return, and population rapidly increased. The first railroad was built, 1847. In 1851 a new constitution was adopted, and between 1850 and 1860 great canal from Lake Erie to the Ohio was completed. In 1857 there occurred another financial panic. The record of Indiana in the Civil War was noteworthy, the state government not merely providing its quota in the field, but meeting and suppressing a dangerous conspiracy at home. Since the Civil War the development of all the industries has been very rapid, and, 1885, a great stimulus was given to the E. part of the state by the discovery and development of the natural-gas field.

Indianap'olis, capital of the State of Indiana, and of Marion Co.; on the W. Fork of White River; near the geographical center of the state; 115 m. NW. of Cincinnati; 194 m. SE. of Chicago; pop. (1907) 233,217. It is in a region unsurpassed in agricultural and mineral resources; near the center of a great corn belt; on the edge of the natural-gas belt discovered, 1885; and within a few hours' travel by railway of immense forests of timber, coal fields covering nearly 7,000 sq. m., and highly productive mines of iron ore. Converging here are trunk lines of railways which, with their branches, extend to every city and town of importance in the country. The city has thus an immense domestic trade, and being also a port of entry it receives direct a large quantity of goods on foreign accounts. The streets are from 60 to 100 ft. wide, and cross each other at right angles, excepting four broad diagonal avenues which converge toward Circle Park in the center. The Central Canal, cutting a bend of White River, furnishes partial water power for various manufactories. The principal industries are the manufacture of foundry and machine-shop products, slaughtering and meat packing, starch, furniture, carriages and wagons, flour, terra cotta, glass, woolen and cotton goods, and saws; number of factory-system establishments (1905) 810; capital invested, $53,419,820; value of products, $82,227,950. The grain elevators have a capacity of 1,000,000 bu. The stock yards cover more than 100 acres of ground, and receive annually more than 1,000,000 cattle, hogs, and horses. Among the notable buildings are the state capitol, Marion Co. Courthouse, Commercial Club Building, Union Station, Federal Building, public library, Masonic Temple, Odd Fellows' Hall, U. S. Arsenal, Heron Art Museum and Art School, post office, Academy of Music. The city has a system of water works which cost $1,000,000. Circle Park contains a statue of Gov. Morton and a soldiers' and sailors' monument, 285 ft. high. Here are situated the state institutions for the deaf, the dumb, the blind, and the insane, and a women's prison and reformatory. The educational institutions include the Univ. of Indianapolis, a state normal school, four medical colleges, a law school, a dental school, and a Roman Catholic theological seminary. Indianapolis was settled, 1819; laid out, 1821; occupied as a state capital, 1825; incorporated, 1836; chartered as a city, 1847. The great number of political and other gatherings that take place here have given it the popular name of the "Convention City."

In'dian Archipel'ago. See MALAY ARCHIPELAGO.

Indian'a Univer'sity, coeducational, nonsectarian institution in Bloomington, Ind.; founded by the state, 1820. Affiliated with it are Purdue Univ., founded as the Indiana Institute of Technology, located at Lafayette, 1869, when it was renamed in honor of John Purdue, and opened, 1874; and the state normal school at Terre Haute. The university proper has a teaching force of about 80, a student enrollment of over 2,000, a library of nearly 60,000 volumes, and grounds and buildings valued at over $350,000. Purdue Univ. is the state college of agriculture and the mechanic arts, and has an excellent equipment for its special work.

In'dian Bean. See CATALPA.

Indian Corn. See MAIZE.

Indian Coun'cil. See COUNCIL OF THE INDIES.

Indian Hemp. See HASHISH.

Indian Mil'let. See DURRA.

Indian, or Sepoy, Mu'tiny, revolt in British India, which began at Meerut, 32 m. from Delhi, April 23, 1857. For refusing to touch greased cartridges, considered by them cere-

monially unclean, the skirmishers of the Third Native Cavalry were on that day imprisoned. On the following day, the native troops, after liberating their comrades and burning the station, marched to Delhi, which was undefended by British troops, and here the Europeans were massacred. The city was besieged by the British for three months, and after a seven days' fight was retaken by Gen. Archdale Wilson. In June Gen. Wheeler was forced to surrender Cawnpur to Nana Sahib, a peshwa of the Mahrattas, and the latter not only massacred the surrendered troops, in violation of his promise, but also butchered the European women. Lucknow was besieged June 30th, was relieved by Gens. Outram and Havelock, September 22d, and by Sir Colin Campbell, November 17th, and secretly evacuated, November 22d. It was not repossessed by the British until March 19, 1858. The principal native princes set an example of loyalty, and although 80,000 to 90,000 soldiers were in revolt, every fortress and city of importance was in the hands of the British by June, 1858. The King of Delhi, for his prominence in the rebellion, was transported as a felon to Pegu.

Indian O'cean, name of the vast sheet of water between Africa, Asia, and Australia. It has no definite S. limit. Its extent from N. to S. is more than 6,500 m., while its breadth varies from 6,000 m. at its S. limit to 4,000 m. between the coast of Arabia and that of Sumatra. On the N. are the three great peninsulas of Arabia, India, and Farther India, separated respectively by the Persian Gulf, the Arabian Sea, and the Bay of Bengal. It receives the waters of many great rivers—notably the Irawadi, Brahmaputra, Indus, Ganges, and Shat-el-Arab (formed by the junction of the Tigris and Euphrates) from Asia, and the Zambesi from Africa; and contains Madagascar, Mauritius, Ceylon, the Seychelles, Comoros, and Andamans, and other important islands. It is traversed by the equatorial current, flowing from E. to W. with a somewhat varying velocity, and forming a very rapid current along the E. coast of Africa.

Indian Riv'er, narrow tidal channel in Brevard and Volusia Cos., Fla., parallel with the coast and for more of its length only half a mile from it; extends SSE. from a point some 18 m. NW. of Cape Cañaveral to Indian River Inlet 100 m. distant, and is continuous S. 50 m. to Jupiter Inlet at St. Lucie's Sound; is navigable, and will admit vessels of 5 ft. draught.

In'dians, name originally applied by Columbus and other early navigators to the aborigines of the W. Indies and S. America, those regions being mistaken for parts of Asia. After 1600 the name was extended in popular usage to include the aborigines of N. America. The American Indians properly constitute the American race. Their physical traits are quite different from those of the peoples of Asia. Two characteristics are especially noticeable, the width of the facial line below the eyes and the general narrowness of the nasal index, the latter giving the thin and prominent nose seen in so many tribes. The cheek bones are usually prominent, the chin well defined and symmetrical, the jaws of medium projection, the orbits of the eyes horizontal, and the dental apparatus well developed.

The color of the American race is a more or less light brown with an undertone of red. The hair of the Indian is usually said to be black, but this is only superficially so. Examined under the microscope, it is seen to be dark, with a well-defined undertone of red. Nor is the hair always straight and coarse, as is frequently stated. Instances are not wanting where it is fine and silky, and among a number of the S. American tribes, and elsewhere, it is slightly wavy or curly. The eye in color is usually a dark brown, rarely a full black. There are instances, somewhat frequent in S. American tribes, where the hue approaches a gray or a dark blue. In size, compared with the features, the eyes incline to be medium or small, and are somewhat sunken. In various tribes scattered over both continents instances of obliquity are found, resembling what are called Mongolian eyes. In reference to stature, there is probably less diversity found among the American Indians than in other races. The Iroquois of New York State and Canada average in height somewhat above the descendants of Europeans On the other hand, there are no instances of dwarfish size. Among the shortest tribes are the Otomis of Mexico, the Warraus of Guiana, and the Yahgans of Tierra del Fuego. All these, however, average above 5 ft.

Indians of North America, members of families and tribes of aboriginal peoples of N. America. Though the tribes were numerous, no single one was very large, the average size being from 200 to 500 persons. Sometimes several cognate tribes lived near together, and were organized into confederacies, but between the homes of tribes or confederates tribes were great spaces of unoccupied territory. All of these tribes were practically sedentary, living in villages, from which they wandered at certain seasons of the year for various purposes, as to visit favorite hunting grounds and fisheries and to gather the fruits of the forest and prairie.

The tribes constituting a confederacy and grouped in adjacent villages usually spoke a common language. In rare cases two or more confederacies spoke the same language. Between Central America and the Arctic Ocean more than 100 stocks of languages were spoken. In some of these stocks from ten to forty distinct languages were found; so that there were in all many hundreds of well-differentiated languages and thousands of dialects.

The arts of these tribes differed widely. More than half of them cultivated the soil, and agriculture prevailed in the E. half of the continent much more than in the W. half. In the humid portions of the U. S. the agriculture was in little patches of natural clearings about villages; in the arid portion, the cultivated spots were close to springs and small streams, which were used in irrigation. A few

plants only were cultivated, maize, squashes, beans, tobacco, plantains, cassava, etc. It was only in the extreme W. and among the prairie tribes that hunting formed the chief subsistence.

The names by which Indian tribes are known to us are a strange medley. Some are nicknames given by the whites, such as Hurons, Iroquois, Nez Percés, Gros Ventres, Diggers, Blackfeet, Flatheads; others are derived from some locality near which they resided, as the Delawares, River Indians, Montagnais, Athapascans, etc. A great many tribes are known to us by the names applied to them by other Indian tribes. Thus the words Mohawk, Sioux, Eskimo, Assiniboins, Arkansas, and Nottoway are not the real names of tribes, but all Algonquin terms. As a general rule, Indians when asked their name give the term Men or Real Men. This is the meaning of Onkwe Honwe, used by the Hurons and Iroquois; Lenni-Lenape, Illiniwek, Irini, Nethowuck, used by

INDIAN WAR CLUB. INDIAN STONE AX.

Algonquin tribes; Tinne, used by the Athapascans; and apparently of Apache. But this meant the tribe as composed of individuals; each tribe as a body had a name, generally that of the animal or object which was the totem of the tribe.

The origin of the American Indians has been a matter of debate. The tribes of N. America regarded themselves as comparatively recent occupants of the soil. The Algonquins and Iroquois had traditions of their journey E. The Athapascans kept up the remembrance of their emigration across the Pacific; the Choctaws came from the NW. While language fails to connect the various tribes with any Asiatic families, their modes of life and implements are thought to connect them with all earlier races of the E. continent whose relics are found in mounds and shell heaps.

In point of manufactures they were about equally advanced. All made pottery. The Rocky Mountains furnished a sheep whose wool several tribes learned to spin and weave. In point of progress the Cherokee and Choctaw Muskogees resembled the N. tribes. The Natchez were the first tribe who seem to have had anything like a temple for worship. The Pueblo Indians, of New Mexico, had towns, built with a dead wall without for protection, rising several stories, and entered by ladders. They had also temples, and cultivated the soil. The Mexican tribes were still further advanced; their range of manufactures and cultivated plants was greater; their means of per-

PIPES WHICH THE COLONISTS FOUND IN USE BY THE INDIANS.

petuating the memory of events better. At the N. the rudest hieroglyphics formed the only means of reading events, the Micmacs in Nova Scotia having the most distinct system, and the only one which Europeans were able to adopt and employ; but the Mexicans had a system of picture writing which gives us an insight into their history.

None of these tribes seem to have domesticated any animal except the dog. In no part consequently were there tribes leading a pastoral life, depending on their flocks and herds. Game was taken with the bow and arrow, or by means of darts or spears; smaller animals

INDIAN TREATY BELT OF WAMPUM.

were taken by traps. Where the game was very abundant, it was sometimes driven into a sort of park and slaughtered. The only beverage of the N. tribes was water, but the Mobilian tribes had their black drink, or *cassine*. All tribes were fond of painting and tattooing their persons, the paint being varied for grief or joy, war or peace. They used as adornments beads made of clam shells, feathers, porcupine quills, and parts of birds and animals. The dress of the hunter tribes was simple, consist-

COSTUMES, WEAPONS, AND UTENSILS OF NORTH AMERICAN INDIANS.

Drawn under the direction of DR. FRANZ BOAZ, Curator of the Department of Anthropology, American Museum of Natural History.

ing of a robe and breechcloth for the men and a short petticoat for the women; in the warmer parts this petticoat was often a mere fringe of moss or other vegetable matter, and men went entirely naked. The use of tobacco was almost universal among the Indian tribes, and has spread over the world. It was introduced at all their important assemblies, and the Mississippi tribes made the pipe the symbol of peace, a usage which spread to other parts of the country.

The amusements of the Indians were the athletic exercise, running, leaping, paddling, games of ball, games with small stones, some quite complicated, and dances. Boys were trained from the time they left the cradle to feats requiring dexterity and courage. The probation of the young warrior was attended in some tribes with long fasts and rigorous tortures. War was carried on rather by treachery and surprise, and by small bands, than by set battles or large armies. Those who fell were in the N. scalped, the hair of the head with the skin being torn off, as once practiced in the E. continent. Prisoners were either adopted and naturalized or tortured. Government was of the slightest kind. Kings and hereditary chiefs were found in some tribes; ability in others raised a man to command. Laws there were none, or courts, or judicial sentences, except among the more civilized in Mexico.

The tribes believed in a future state of existence. Food was placed on the graves of the dead, and implements of the chase for use in the next world. They recognized a supreme being, and a host of spirits good and evil, the latter especially to be propitiated. The idea of sacrifice was apparently universal, and animals and human beings were offered, the former as substitutes for the latter. Cannibalism, except where impelled by necessity, was apparently connected with religious ideas. Being firm believers in the power of evil spirits, they ascribed disease and defeat to their malign influence; and the medicine men, who were supposed to counteract these, were resorted to in sickness, and when starting on the warpath, the hunt, or long and perilous journeys by land or water. Dreams were regarded as manifestations of cravings of the soul, the nongratification of which would be attended with serious injury to the whole man. Tribes were divided into clans, and, as a rule, no man could marry in his own clan, and the children followed the clan of the mother.

Woman was in a degraded state. She did all the work except war and hunting. She tilled the earth, and bore all burdens. Baking was done in holes in the ground, and water was boiled by throwing heated stones into it. The common plan was to roast over the fire. Corn was parched, and was the food used while traveling. Some diseases introduced by the whites, such as smallpox, became destructive and fatal. Disease was left to charlatans and superstitious treatment. The use of vapor baths was perhaps the most general remedy. The Indians were acquainted with many poisons, which they used for self-destruction, for revenge, and in the S. parts for poisoning their weapons.

The Indian population before 1492 was astonishingly small as compared with the extent of territory, and during late decades no important decrease has been noted; indeed, some tribes have increased. In 1906 the Commissioner of Indian Affairs reported a population on the various reservations of 291,581, including Indians, half breeds, and squaw men. The Canadian census of 1901 gave the number of Indians and half-breeds in the Dominion at 127,932. Indians in the U. S. "not taxed"—*i.e.*, in tribal relations—are excluded by the Constitution from the basis of political representation. The several tribes are regarded as domestic, dependent nations, governed by their own laws, yet subject to the sovereignty of the U. S.; having a right of occupancy in their lands, yet without the power to cede those lands except to the U. S. The policy of removing the Indians to lands W. of the Mississippi was inaugurated abt. 1825, and largely carried out in the twenty years following, especially with the S. or Appalachian Indians — the Creeks, Choctaws, Chickasaws, Cherokees, and Seminoles. Besides the Indian Territory, other large reservations have been set apart for Indian occupation, especially in Montana and the Dakotas.

Indians of South America, Indians divided into many tribes, among whom are the Cunas and Timotes of the Isthmus of Panama and the adjacent regions; the Chibchas of the upper waters of the Magdalena River; the Kechuas or Inca Nation of the slope of the Andes; the Aymaras of Bolivia; the Tupis of the Atlantic shore of Brazil and of the Amazon; the Caribs, whose scattered tribes extended from S. Brazil to the coast of Guiana and the islands of the W. Indies; the Araucaniaut of the pampas of Argentina and of Chile; and the Yahgans of Tierra del Fuego.

The Chibchas were an inoffensive agricultural people, ignorant of the use of metals, and manufacturing their weapons and utensils out of stone and wood. The Kechuas were the most powerful and cultivated nation on the S. continent, and their language was spoken by adjoining tribes uninterruptedly from the vicinity of Quito on the N. to the river Maule in Chile, a distance of 1,500 m. or more. With few exceptions all these tribes were under the government of the Incas, whose capital was at Cuzco, and nearly all of them enjoyed a comparatively high state of the arts. Agriculture was cultivated with assiduity. The llama and the paco were bred for their hair, for sacrifices, and for beasts of burden. The hair of the various species of llama and cotton were spun and woven into a large variety of fabrics, often beautifully dyed and ornamented. Pottery making was a favorite industry, and much artistic work in gold and silver was produced.

The artistic development of the Aymaras and Tuncas, neighbors and finally subjects of the Incas, was inferior to that of the Kechuas. They were agricultural, they built homes of sun-dried brick and stone, they were skilled potters, and they had some knowledge of the metallurgy of the precious metals. The na-

tives in the Amazonean and Pampean regions had made comparatively little progress. Generally they had no fixed home and depended on natural products for a subsistence. They were usually scantily clothed. Some, as the Caribs, made excellent canoes, others, as the Botocudos, of Brazil, knew nothing about navigating the streams along which they dwelt.

The government of the more savage hordes was of the simplest. The chief was usually elected, but had to make good his claim to his place by constantly exercising greater skill or strength. In the more civilized nations, especially among the Kechuas, the family and tribal systems were well defined and intricate, and were based on the totemic theory of relationship.

The religion of the more savage tribes was usually a crude animism, and its teachers were the native priests or shamans, whose influence was potent. A variety of ancestor worship also prevailed, and a firm faith in the life after death. In some individual examples the ancient Peruvians seem to have recognized the existence of a single supreme and spiritual ruler of the universe.

INDIANS OF CENTRAL AMERICA, aborigines of the area which extends from the Isthmus of Tehuantepec to the Isthmus of Panama. Much the most important of these groups was the Maya stock. Its members spoke a common language divided into about eighteen dialects. Next in importance to the Mayas were the Chiapanecs. A populous branch, estimated by the Spanish explorers at abt. 40,000 persons, lived on and near Lake Managua in Nicaragua, where they were known as the Mangues.

The Mayas excelled all other native tribes of the continent in architecture and in the art of writing. They made many books. Their alphabet was hieroglyphic. Using the leaves of the maguey, they carried the art of paper making to as great perfection as did the Mexicans. They made delicate fabrics of cotton, and skillful articles of feathers. Gold, silver, and copper were sparingly used for purposes of ornamentation. Flat pieces of copper were in use as a currency, and cacao beans, shells, and certain precious stones were employed for the same purpose. The Mayas maintained commercial intercourse with Cuba, making their voyages in canoes. The Maya tribes were agricultural, and maize or Indian corn was their chief crop. The Maya language is still spoken in its purity by 250,000 people.

Indian Ter'ritory, a former territory of the U. S. of America (W. group); originally set apart by the Federal Government as a permanent home for the Indian tribes living on reservations E. of the Mississippi River. Previous to 1890 Indian Territory included an area of about 71,000 sq. m.; was bounded N. by Kansas, S. by Texas, E. by Arkansas, W. by Texas and New Mexico; after the Territory of Oklahoma was created (1890) its area was reduced to 31,400 sq. m.

The original Indian Territory was included in the Louisiana Purchase of 1803, and was selected by the U. S. Govt. in 1832 as a permanent home for the various Indian tribes then living E. of the Mississippi River. In 1834 Congress first set aside definite reservations for the largest tribes, and under treaty the Cherokees, Chickasaws, Choctaws, and Creeks removed thither, and at various intervals were followed by the Seminoles, Sacs and Foxes, Comanches, Modocs, Nez Percés, and other tribes. During the Civil War a large part of the Indians of the Five Nations served in the Confederate army. The first partitioning of the territory was in 1866, when the Creeks ceded to the U. S. Govt. the W. half of their reservation, and the Seminoles all of theirs, and these lands, aggregating nearly 5,500,000 acres, became known as "the Oklahoma country." On April 22, 1889, 3,000,000 acres of the Oklahoma country were thrown open to settlement by act of Congress, and by act approved May 2, 1890, the W. half of Indian Territory, including the Oklahoma country and "the public land" strip, was erected into Oklahoma Territory. In April, 1892, the country of the Cheyennes and Arapahoes, containing 6,500 sq. m., having been acquired from the Indians by treaty, was thrown open to settlement; and in 1893, the Cherokee Outlet, containing 9,110 sq. m., was similarly opened and was incorporated with Oklahoma.

It was the only unorganized territory in the U. S., being without the form of government prescribed by Congress for the territories, and its inhabitants were governed by principal chiefs, by national legislatures, and by ancient tribal usages, under Federal supervision by officers of the Bureau of Indian Affairs. In 1907 Oklahoma and Indian territories were admitted into the Union as the State of Oklahoma.

In'dia Rub'ber. See RUBBER.

Indict'ment, written accusation of an offense, preferred to, and presented on oath as true by, a grand jury. Indictments are to be preferred in criminal matters only, and they lie for all treasons and felonies, for all misprisions (concealments) of treason and felonies, and for all misdemeanors of a public nature. On information by parties who are cognizant of the criminal acts alleged, an indictment is framed by the proper prosecuting officers, and laid before the grand jury. If the jurors, after hearing the evidence, do not find a "true bill," the party, if in custody, is entitled to be discharged without further answer. If the bill be found to be a true bill, it is returned into court, and the party stands indicted and may be required to answer to the charges. The indictment is intended to be a plain and certain narrative of the offense charges. The indictment is intended to be a plain and certain narrative of the offense charged, and of the necessary circumstances that concur to ascertain and define the fact and its nature.

In'dies, East. See EAST INDIES.

Indies, West. See ANTILLES; WEST INDIES.

Indiges'tion. See DYSPEPSIA.

Indigirka (in-dē-gēr'kä), or **Zapadnaia Kolima** (zä-päd'nī-ä kō-lē'mä), river of E. Siberia; rises in the Yablonoi Mountains, in the government of Jakutsk, and enters the Arctic Ocean after a course of 1,000 m., mostly through deserts and frozen marshes. A few villages are scattered along its banks, whose inhabitants live exclusively by hunting.

In'digo, deep blue vegetable dyestuff, known to the ancients by the name of *indicum*, from its being brought into Europe from India. The use of indigo in dyeing was probably introduced into Italy as early as the eleventh century. In the beginning of the seventeenth century the importations from the E. Indies into Holland assumed importance. Its introduction caused great complaint on account of its superseding the indigenous woad. The German Diet prohibited its use, 1577, and the English Parliament, 1581; and these laws were long stringently enforced. Indigo is a product of

INDIGOFERA TINCTORIA.

numerous plants belonging to the order *Leguminosæ*, and indigenous to the tropical regions of Asia, Africa, and America. *Indigofera tinctoria* is the one most cultivated in the East, and *I. anil* is most employed in the U. S.; these two specimens are found naturalized in the S. states as remains of former cultivation. *I. Caroliniana* and *I. leptosepala* are indigenous species from N. Carolina to the S., and are said to be useful in domestic dyeing. The coloring principle is extracted by fermentation in vats, precipitated, and formed into cakes. The best Bengal indigo is the superfine or light blue, in cubical cakes, so light as to float on water, friable, soft, of clean fracture, and of a beautiful copper color when rubbed with the nail. The best American qualities, as some of those from Guatemala and Caracas, are equal to the best Bengal. Considerable quantities have been produced in the S. U. S.

Indigo Bird, popular name of a beautiful finch (*Cyanospiza cyanea*), a native of the U. S.; of a rich greenish blue, feeds on seeds and insects, nests usually on a low bush or on tall grass, and winters in tropical America.

INDIGO BIRD.

1. Male. 2. Female.

The bird is nearly 6 in. in length, and has a brief but very pleasant song.

In'dium, rare metal, discovered, 1863, by Reich and Richter, by means of spectrum analysis, of the zinc blende of Freiberg; and since been found in other localities. It is a brilliant, silver-white metal, related to cadmium and zinc, easily scratched by the finger nail, and gives two characteristic lines on the spectrum—one violet, another blue. Its specific gravity depends on the method of its preparation, and varies from 7.11 to 7.42. The melting point is 176° C.

Individ'ualism, term designating a point of view in political economy according to which the general welfare is best subserved by allowing the greatest latitude of conduct to all individuals and restricting the sphere of government as much as possible, so as not to interfere with personal initiative and action. It is opposed to paternalism, socialism, communism, etc., and to government ownership of public utilities, or government interference with any matters of private concern. It regards full competition as the best means to secure the survival of the best economic types, and has been summed up as the doctrine of "*laissez faire*" ("let alone"). The sphere of government is limited to the keeping of order and the enforcing of contracts.

In'do Chi'na, or **Far'ther In'dia**, name invented by Malte-Brun for the E. of the three great peninsulas on the S. of Asia; lies to the S. of China and Tibet, and has the Bay of Bengal on the W. and the China Sea on the S. and E.; total length, from N. to S., about 1,800 m., of which more than one half belongs to the Malay Peninsula; greatest breadth, about 1,000 m.; area, 815,000 sq. m.; pop. est. 33,625,000. On the W. coast is indented by the Gulf of Martaban, on the S. is the great Gulf of Siam, while in the

NE. is that of Tonking. Indo China was little known to the ancients, though it is possible that the Golden Chersonese of Ptolemy may have been the Malay Peninsula. From the seventh century knowledge concerning it began to reach Europe through the Arabs. In the Middle Ages it was visited by Marco Polo and Nicolao di Conti, who reached Arrakan and the Kingdom of Ava (Burma). The Portuguese appeared in the seas of Indo China, 1508, and established themselves at Malacca, 1511. The Dutch followed, but the Europeans were expelled in the seventeenth century. A few priests and Jesuits remained, however, and the number of Roman Catholics in the French possessions is now large. The British gained a footing, 1825, and gradually extended their possessions until 1885, when all Burma came under their power. The French annexed Cochin China, 1862 and 1867; Cambodia, 1863, and Annam and Tonking, 1883.

Indo China, French, possessions acquired by France in the Indo China Peninsula; form one colony, governed from Paris, a French governor general at Saigon carrying out the mandates of the colonial office. The colony includes the old states of Cambodia, Cochin China, Annam, Tonking, and about 110,000 sq. m.; E. of the Mekong River, formerly belonging to Siam; total area, about 256,000 sq. m.; pop. est. 18,230,000. The colony of French Indo China is three times as large as France.

Indo-Europe'ans, members of the Indo-European speech family, otherwise known as Indo-Germans or Aryans. This family includes at least eight chief groups of languages—the Indo-Iranian or Hindu-Persian, Armenian, Greek, Albanian, Italic, Celtic, Teutonic, Balto-Slavic or Letto-Slavic. It is distinctly a speech family, rather than a race. In its present extension it has absorbed the blood of many distinct races; thus, in India the Dravidian, in parts of Greece and Asia Minor the Tyrrhene-Pelasgic, in S. Italy and Spain the Iberian, in NW. Italy and Switzerland the Ligurian, etc., but even at the earliest point where the Indo-Europeans emerge into history the Indo-Europeans were not of homogeneous race. Which of the early races inhabiting Europe represents, however, the original possessor of the Indo-European language is open to question. The Iberians, spreading over extreme W. Europe, Spain, and S. Italy, were short of stature, long-headed, and of swarthy complexion. They are represented to-day by the Basques, the Corsicans, and part of the Welsh and Irish.

A second race, represented to-day by the Slavs, Lithuanians, and a portion of the Celts, and perhaps the Danes, was tall, broad-headed, gray-eyed, with reddish hair, and spread over E. Europe, S. Germany, Belgium, and parts of France. A third race, whose type is best preserved to-day among the Swedes, Frisians, and N. Germans, was tall, long-headed, blond, blue-eyed, fair-skinned. It is in this race that the majority of anthropologists find the original authors of Indo-European speech, but there are not lacking indications which point to the second.

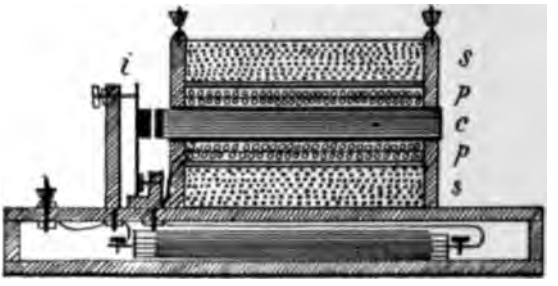
In'dore, native state and its capital in central India. The state is also called the Holkar's Dominions, from a title of the reigning family. It is one of the principal feudatory states of British India. It is in many detached divisions in the W. part of Central India, some in the valley of the Nerbudda, others in that of the Chambal; area, 9,500 sq. m.; pop. (1901), 850,690. The ruling race is the Mahratta, but there are many other classes of Hindus in the state, besides Ghonds and Bhils. The latter are to be found in the mountains, and are considered the aborigines. The city of Indore is on the Kan or Katki River, an affluent of the Chambal, about 2,000 ft. above sea level; was founded in 1770, and is well constructed and healthful. The political agent of the British Govt. for central India lives near by with a small garrison of troops, and near the garrison is the College of Rajkumar, intended for young princes of the states within the general agency.

In'dra, in Hindu mythology, the god of the firmament. The primitive Aryans of India believed that it was the sky which caused rain, and they therefore regarded Indra, or the sky, as the chief of the gods. From all that we find narrated about Indra, it is evident that his causing rain was regarded by Hindus as the most important evidence of his divine power. In offering him praise as the sender of rain, they fancied that the cloud which failed to bring rain was an asura, or demon. Such a cloud was particularly a vritra (from vri, to hide or envelop), because it spread over the face of the heaven and tried to obscure the face of the sun. Hindus pictured Indra's undertaking to cause rain as his going forth to do battle with this evil vritra. As Indra was completely victorious in every one of his contests with the cloud demons, he gradually came to be regarded generally as the giver of victory.

Indre (ăṅd'r), river of France, chiefly in the department of the same name; flows in the Loire SW. of Tours, after a NW. course of 150 m.; is a sluggish stream, intersected by dams, and is not subject to floods.

Induc'tion, process by which facts or phenomena are investigated in order to discover their laws or causes. Its problem may be stated as follows: Given a phenomenon or group of phenomena related in certain ways to other phenomena; to investigate these relations in order to determine the laws or causes of the phenomenon or group. Under this general statement all classes of induction may be subsumed. By induction we rise from the known to the unknown, and obtain from particular facts a general conclusion. In deduction (*q.v.*) the mental process is reversed, and we proceed from broad general notions to narrow, particular facts. As examples of induction, the appearance of dew on clear nights and its nonappearance on cloudy nights will suggest the problems of the causes of dew; or, in a case of food poisoning where only certain members of a party have suffered, the problem is simplified by disregarding all the articles of food eaten by any of the uninjured persons.

Induction Coil, a device for producing currents of high electro-motive force which are able to send sparks across air spaces that ordinary batteries cannot possibly pierce, sometimes called a sparking coil. The essential parts of an induction coil are (1) a central core (c, in accompanying figure), usually consisting of a bundle of soft, straight iron wires; (2) a primary coil (p), consisting of one or two layers of coarse insulated copper wire



INDUCTION COIL.

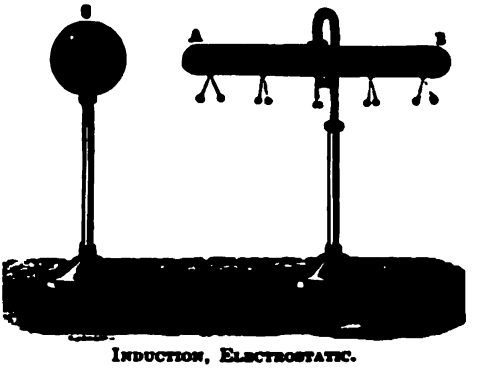
wound about the iron core, from which they are carefully insulated; (3) a secondary coil (s), consisting of many layers of very fine insulated copper wire wound about the primary coil, and (4) an interrupter or vibrator (i), by means of which the circuit of the primary coil may be opened and closed with great rapidity. The principle of the vibrator is the same as that of the familiar vibrating electric bell. The operation is as follows: A current from a battery passes through the primary coil, thereby magnetizing the core of soft iron wires; the armature of the vibrator, which is in circuit with the primary coil, is attracted by the magnetized core, thus interrupting or breaking the circuit. As soon as the circuit is broken the core loses its magnetism and the armature falls back to its original position. This operation is rapidly repeated—*i.e.*, the armature is made to vibrate rapidly.

On account of the great length of wire in the secondary coil of fine wire and the rapid cutting of the lines of magnetic force in the core, due to the sudden magnetization and demagnetization of the core, a current of very high voltage, or electro-motive force, is generated or induced in the secondary coil. If the terminals of the secondary coil are separated a spark of great intensity will jump from one terminal to the other through an air gap or space of greater or less length, according to the strength of the current. The induction coil is used in electric gas-lighting apparatus, cigar lighters, for igniting the explosive mixture in gas engines, and for setting off explosives in blasting operations, torpedoes and mines. It is also most important as a part of wireless telegraph outfits.

Induction, Elec'tro-magnet'ic, name given to phenomena which are related to or accompanying the establishment of a magnetic field, or which result from changes in such a field. In 1831 Faraday discovered that currents could be induced in a closed circuit by moving magnets near it or by moving the circuit across the magnetic field. The action of a magnet or current in producing such induced currents is called electro-magnetic induction, or simply induction. Such currents are called induced currents; they last only as long as the movements or changes in question are going on; the direction which they take are expressed by Lenz in the form of a law, as follows: "Induced currents which result from movements or other changes in an electro-magnetic system are always in such a direction that they tend to oppose these movements or changes." This principle governs the operation of the modern dynamo machines and electric motors, as well as induction coils, alternate-current transformers, and other appliances. Electro-magnetic induction affords the most important means known for the production of electrical currents. This is shown in the dynamo-electric machine, in which a conductor is made to revolve rapidly in the magnetic field of an electric magnet, causing the conductor to cut the lines of force in this field many times a second.

If a coil of insulated wire be connected in circuit with a delicate galvanometer and a permanent magnet be inserted rapidly into the hollow of the coil a momentary current will be induced in the coil, and will be indicated by a movement of the galvanometer needle. While the magnet remains motionless no current is produced. When the magnet is withdrawn a current of the same intensity will flow, but in an opposite direction. If a current be caused to flow through the coil and a soft iron bar be inserted in the hollow of the coil, the iron bar will become magnetic and remain so as long as the current flows. This is called an electro-magnet.

Induction, Electrostat'ic, or electrification by influence, the name given to certain electrical phenomena which deal with the influence of charged bodies upon others not



INDUCTION, ELECTROSTATIC.

charged. If a glass ball, C, be positively electrified and placed near a body not electrified or so charged as a conductor, AB, consisting of a long, cylindrical piece of metal, either hollow or sealed, held upon a glass support, the influence of the positive charge of the ball

will induce electrification on this conductor and it will behave at its two ends as though it had been electrified. The ends of the conductor attract bits of paper, and pith balls hung to the ends are repelled. The middle portion of the conductor will, however, give no sign of electrification. Furthermore, it will be found that the two electrifications of the ends are of opposite kinds, that nearest the excited glass ball, C, being negative (—) and at the farthest end positive (+). It therefore appears that a positive charge attracts negative and repels positive and that this influence can be exerted at a distance from a body.

If a stick of sealing wax be used, charged negatively, it will induce a positive charge on the near end and a negative charge on the far end. This discovery is credited to John Canton in 1753, and is called *influence* or *electrostatic induction.* This influence will take place across a considerable distance. The word induction, as originally used, was intended to denote an action at a distance in contradistinction to conduction, which implied the conveyance of the action in a material conductor. Other actions at a distance, such as the induction of currents by moving magnets and the induction of magnetism in iron by the presence of a magnet, has brought about the use of the word *influence* for the induction of charges by charges.

Induc'tive Capac'ity (specific), the dielectric constant. The capacity of a condenser of given dimensions varies according to the nature of the dielectric used. Specific inductive capacity is a constant which expresses the quality of the medium in this respect. Specific inductive capacity is measured by using the materials to be tested in a condenser, and determining the quantity of electricity necessary to produce a given difference of potential between the plates, in each case, compared with the quantity when air is the dielectric. The dielectric constant varies with the duration of the charge to which the condenser is subjected, diminishing to a minimum value for infinitesimal periods. It varies also with the temperature of the dielectric, rising with the same.

Indul'gence, in the Roman Catholic Church, a total or partial remission of the temporal punishment still due to sin after the guilt has been remitted by penance. It is granted through the power of the keys by an application of the treasure of the Church. An indulgence cannot be granted for unforgiven sin. It is not the remission of sin nor of the eternal punishment due to mortal sin, still less is it a permission to commit sin in the future. Before an indulgence can be gained, sin must have been previously remitted by repentance. Thus instead of being an encouragement to sin, it is a strong motive to repentance.

In'dus, great river of S. Asia; in the W. part of British India; rises in the Himalayas, on the N. side of the Kailas, at an elevation of 18,000 ft. After receiving the Gartok, it bursts through the Himalayas and flows through the lowland to the Arabian Sea. At Attok, the point where Alexander the Great entered India, 940 m. from its outlet, and at an elevation of only 1,000 ft., it receives the Kabul and becomes navigable; 470 m. from the ocean it is joined by the Punjab (liter., the five rivers from it, *viz.*, the Jhilum, Chinab, Ravi, Bias, and Sutlej), but at Migani, 8 m. N. of Haidarabad and 75 m. from the ocean, it divides and forms a delta whose breadth along the coast is 130 m. It enters the Arabian Sea through a great number of mouths, of which even the widest and deepest is not accessible for vessels of more than fifty tons, the channel being much encumbered by shoals and mud banks. The Indus abounds in fish and crocodiles. Its length is about 1,800 m.; area of basin, 300,000 sq. m.

Indus, in astronomy, a constellation of the S. hemisphere, between Sagittarius and the S. Pole; largest star is of the third magnitude.

Indus'trial Exhibi'tions. See EXPOSITIONS.

Industrial Insur'ance. See INSURANCE.

Industrial Peace Commit'tee, body of eight citizens representing (1) the public, (2) employers, and (3) labor; appointed, 1907, by the trustees of the Nobel peace prize of $40,000, awarded to Pres. Roosevelt and by him given to trustees for the establishment of a foundation for the promotion of industrial peace. The committee is charged with holding an annual conference of representatives of capital and labor for the discussion of industrial problems, with the view of arriving at a wholesome understanding between employees and employers, with holding special conferences in case of great industrial crises, and with taking such other action as may be deemed advisable to promote the objects of the foundation.

Industrial Schools. See SCHOOLS.

Inebri'ety. See ALCOHOL, PHYSIOLOGICAL EFFECTS OF.

Iner'tia, universal property of matter by reason of which if in motion it will forever continue in motion, or if at rest it will forever continue at rest, unless operated on by some external force. See ENERGY; FORCE.

I'nez de Cas'tro, called COLLO DE GARZA—"heron's neck"; d. 1355; Portuguese princess, descended from one of the richest and noblest families of Galicia, and renowned for her beauty. When her cousin, Donna Constantia, married Dom Pedro, the Crown Prince of Portugal, Inez accompanied her as maid of honor. Dom Pedro falling in love with her contracted a morganatic union, and when, 1345, Donna Constantia died, he secretly married her. In 1355 Dom Pedro's father, the old King of Portugal, Alfonso IV, had her assassinated for political reasons, and the passionate depth and intensity of the love which Dom Pedro had entertained for her became apparent in his sorrow and revenge. According to the familiar legend, when Alfonso died, 1357, and Pedro became king, the corpse of Inez was placed on the throne in royal attire and received royal homage; then it was solemnly entombed under a magnificent monument and with gorgeous processional pomp.

Infallibil'ity of the Pope, doctrine of the Roman Catholic Church, which attributes to the Roman pontiff as pastor of the whole Church, the privilege of being preserved from teaching error. Infallibility is not to be confounded with impeccability, which means immunity from sin, or with inspiration. Pontifical infallibility is thus defined in Chapter iv of the Constitution "Pastor æternus," adopted by the Vatican Council, July 18, 1870: "We teach and define that it is a dogma divinely revealed, that the Roman pontiff, when he speaks *ex cathedra*, that is, when, in discharge of the office of pastor and doctor of all Christians, by virtue of his supreme authority, he defines a doctrine regarding faith and morals to be held by the universal Church, by the divine assistance promised to him in blessed Peter, is possessed of that infallibility with which the Divine Redeemer willed that His Church should be endowed for defining doctrines regarding faith and morals; and that, therefore, such definitions of the Roman pontiffs are irreformable of themselves and not by the consent of the Church."

In'fant, in law, a person who is legally incapacitated because of age. The period of nonage and its disabilities are determined by positive law, and vary in different jurisdictions. By the common law every person under twenty-one years of age is an infant, or (as he is also called) a minor. As that law does not recognize fractions of a day, majority is reached at the beginning of the day preceding the twenty-first birthday. In the Roman law nonage, in case of one not under *patria potestas*, extended to the twenty-fifth year, but was divided into three stages. The first extended to the end of the seventh year. During this period the infant was deemed to have no legal understanding, and was devoid of legal capacity. From the beginning of his eighth year to puberty he was able to understand the language of legal transactions, but had not legal judgment. This judgment could be supplied only by a *tutor*. Hence during this stage the infant could bind himself by stipulation with the tutor's authority. After puberty, which was fixed at fourteen in males and twelve in females, he was called a minor. From this time to the age of twenty-five he was not subject to a tutor, although he might have a curator appointed, and his disabilities were greatly diminished.

The most general legal principle in reference to an infant is his inability to bind himself by his contract. This inability being intended for his benefit, the most important exception is, that he may bind himself by his contract for necessaries, which are said to be not only shelter, clothes, and food, but all those things which it is perfectly proper for an infant to have in view of his age, means, and circumstances. In the U. S. it is held that a good education is among these necessaries. So, as an infant may lawfully marry, necessaries for his wife and children may be lawfully contracted for by him. The prevailing rule is, that all contracts of an infant, not for necessaries, are voidable by him, but that none are void; because all may be made valid by his ratification after full age, which could not be the case if they were wholly void at their inception. No one can take advantage of the disability of an infant but himself or his legal representatives. Therefore, if an adult makes a business contract with an infant, the adult is bound, although the infant is not. While an infant is protected against his contracts, he is not protected against his acts; that is, he is answerable in like manner as any other person for the injury he inflicts by his wrongdoing, excepting so far as actual infancy or immaturity tends to make him irresponsible, or to excuse him, as an equal amount of actual incapacity would excuse anyone.

Infante (In-fan'tā), in Spain and Portugal, the official title of the princes of the blood royal, the princesses being called *infantas*. The specific title of the heir apparent to the throne, however, is not *infante*; in Spain his title is *príncipe de Asturias*, or simply *el príncipe*, the prince; and in Portugal, until the separation of the American colony, he was called the Prince of Brazil.

Infan'ticide, at common law, the killing of a young child after its live birth. In English law infanticide is a species of homicide, and whether the child is a minute or a week old is immaterial. From the common-law conception of homicide, it follows that the death of the child must take place after its complete separation from the mother, and its entrance on an independent existence. Feticide, or the killing of a child before its live birth, was not a crime at common law, but has been made such by statutes. If death occurs after live birth from injuries inflicted on the fetus, before complete separation from the mother, it is a case of infanticide, and will be murder, manslaughter, or excusable homicide, according to the facts.

In'fantry, that portion of a military establishment which is armed and equipped for marching and fighting on foot, in contradistinction to artillery and cavalry. It is the oldest of the "three arms" into which armies are conventionally divided; was the favorite of the Greeks, the Gauls, the Germans, and the Franks, and was mainly that with which Rome conquered the world. Under Grecian and Roman civilization it attained preëminence as *the arm of battle*, but fell into contempt and comparative desuetude early in the Middle Ages, and did not emerge from that obscurity till the decline of the feudal system. Steadily increased in power from the first years of the fourteenth century, and is now recognized as the principal strength of military organizations. This importance results from the fact that it can be used everywhere, "in mountains or on plains, in woody or open countries, in cities or in fields, on rivers, or at sea, in the redoubt or in the attack on the breach." It is the self-sustaining arm in the field of battle, and is moreover less expensive, man for man, than its auxiliaries. The army

of the U. S., as organized under acts of Congress, February 2, 1901, January 25, 1907, and April 23, 1908, contained an infantry force of thirty regiments, embracing 530 officers and 26,616 enlisted men.

In'fant Schools, term originally applied to charitable institutions that sprang up in the early part of the nineteenth century, simply to relieve the mothers of the laboring classes of the care of their little children when they were away at day labor. Their value was merely that they kept the children out of the streets and physically comfortable. They got the name of *schools* because among the devices for keeping the children quiet by circumventing their spontaneous activity, they were taught to march, to perform some gymnastic exercises, and to sing in rhyme or intone the multiplication table, the names of the days of the week, of the months of the year, and other things of that kind. Some of the disciples of Pestalozzi, and especially Wilderspin, endeavored to develop something educational out of these charitable institutions, introducing some object teaching; but they were not even the germ of the *kindergarten*, because they were not founded on any study of the nature of childhood.

Infec'tious Diseas'es, in modern usage, those diseases which result from the invasion and multiplication of disease-breeding microörganisms, such as bacteria, fungi, and protozoa, and therefore distinguished from the intoxications caused by snake poison, putrid foods, etc. By a contagious disease is ordinarily meant one communicated by contact with a diseased person, but the line between contagious and noncontagious diseases is hard to draw. The mode of egress of the infectious principle from the body is the factor which determines the contagiousness of a disease. Diseases in which the microörganisms are found in the peeled-off skin flakes are easily transmitted to persons near the patients, while such as typhoid fever and Asiatic cholera, in which the organisms are thrown off from the intestines, are communicated in a roundabout way, and are therefore considered as noncontagious. Some diseases, such as malaria or yellow fever, pass in a roundabout way from patient to patient, being communicated by the bite of a mosquito which has become infected through previously sucking the blood of an infected human being.

The identification of the particular microorganisms causing various diseases is proceeding steadily; and in the majority of diseases, as tuberculosis, typhoid, etc., the cause has been demonstrated beyond a doubt. The microorganisms in infectious diseases may gain entrance to the system through the mouth, the air passages, the skin, the genito-urinary tract, or through wounds. After entrance into the body the microörganisms multiply and rapidly produce certain poisons called toxins or poisonous proteids, which occasion the symptoms of disease, so that the microörganisms do not often themselves give rise to the disease directly. The same class of poisons is often developed in decomposing meat, fish, cheese, and may give rise to disease manifestations closely like those witnessed in infections. During the multiplication of microörganisms within the system there are produced, in addition to the toxic products, certain substances which so act upon the system that it is enabled to withstand the present attack, and that it becomes immune from subsequent seizures. Thus an individual once having typhoid fever, typhus fever, or smallpox, rarely acquires a second attack, while in the case of diphtheria the period of immunity is brief, and second attacks after that interval are not infrequent. See CONTAGION; GERM THEORY OF DISEASE.

In'fidel, term applied, usually with something of reproach, (1) to disbelievers in the Christian religion, whether atheists or deists; (2) to nonbelievers, such as Mohammedans and heathens, but this use of the word is antiquated and infrequent; while (3) the skeptic or doubter, as a nonbeliever, is also to some extent liable to the reproach of infidelity; and in popular usage the term free thinker is synonymous with infidel. Mussulmans apply the term to Christians. See AGNOSTICISM; ATHEISM.

In'finites and Infinites'imals, in mathematics. An infinite quantity, or infinite, as it is commonly called for brevity, is an auxiliary quantity, which we conceive capable of increasing beyond any assignable limit, in order to discover relations thus arising between other quantities; while an infinitesimal is an auxiliary quantity which we suppose capable of becoming smaller than any assignable quantity, in order that we may thereby determine the relations between certain other quantities. The principles by which this is done depend on the doctrine of limits.

Inflamma'tion, term used to include the series of phenomena which make themselves apparent whenever any part of the body sustains an injury. It is the reaction of the organism against the injury, whether that injury is a cut or blow or an invasion of bacteria. It is only necessary that there should be a destruction of tissues brought about in some way to have the phenomena of inflammation excited. If a part of the skin is inflamed, four changes take place in it. The part inflamed is redder than the surrounding parts, it is hotter, it is swollen, and it is painful. Heat, redness and swelling, and pain have long been recognized as the cardinal symptoms of inflammation. The redness of the inflamed part is due in the first place to the dilatation of the vessels, which become gorged with blood. If the inflammation is only slight, pressure on the part may press out the blood from the dilated vessels, and for a moment, when the pressure is removed, the part will have the normal color. The blood current in the inflamed area becomes slower and the white blood cells range themselves round the vessel walls preparatory to passing through the wall and massing themselves as a protective barrier between the injured or invaded part and the healthy surrounding tissue. If the organism

is strong enough this wall of white cells or leucocytes will close in round the wound or group of invading germs and a local abscess will result. If the organism is weak in vitality the white cells may be overpowered, and the infection break through and be carried to all parts of the body, causing "blood poisoning." If the inflammation has gone on to the point where the red corpuscles, as well as the white, leave the walls of the vessels and are found in the tissue, these cannot be pressed out, and the redness will remain in spite of pressure.

The part is hotter than the surrounding parts. There is not only the subjective sensation of heat in the inflamed part, but it feels hotter to the hand than the surrounding parts, and is actually hotter than a neighboring portion of the skin. The increased heat is due to the rapidity of the circulation and the fact that time is not allowed by the rapidly circulating blood for the escape of the heat which has been brought from the heat-producing centers. The swelling of the part is due to the escape into the tissue of the fluid and corpuscular elements of the blood. The pain which is felt, not only on pressure, but without pressure as well, is due to the swollen tissues pressing upon the nerves. The part can now, under certain circumstances, be restored to its normal condition.

Almost all inflammations, if they are sufficiently extensive, are accompanied by an elevation of the general body temperature; there is the production of fever. This inflammatory fever in some cases may reach quite a high point, from 4° to 7° above the normal temperature of the body. The fever is due to the absorption by the blood of some of the products of inflammation, and also to the increased activity of the vital functions in their reaction against the injury. Inflammation occurs in most diseases, its location being designated by the name of the part affected followed by the termination—itis; thus peritonitis is inflammation of the peritoneum, meningitis of the meninges or brain coverings, nephritis of the kidneys, appendicitis of the vermiform appendix, etc.

Inflores'cence, term which botanists use to designate the arrangement of flowers on a plant. Flowers and branches are evolved from buds. These two kinds of buds agree in the positions which they occupy; consequently, flower buds, like leaf buds, may terminate the stem or branches or may rise from the axils of leaves. The former are called *terminal*, the latter *axillary*. When one flower only occupies the summit of the stem, it is *terminal and solitary*; when only one occurs in the axil of a leaf, it is *axillary and solitary*. If several flowers are developed near each other on a stem or branch, so as to form a cluster, the contiguous leaves are generally unlike ordinary foliage, and are known as *bracts*. The stalk which supports a flower or a flower cluster is its *peduncle*, and the stalk of each flower of a cluster, its *pedicel*. When flowers have no supporting stalks, they are *sessile*. The *axis of inflorescence* is the name given to that part of the stalk on which the flowers of a cluster are arranged. When it bears sessile flowers, it is called the *rhachis*; when it is very much

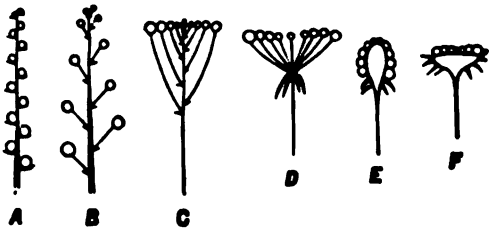


FIG. 1.—INDEFINITE INFLORESCENCES.

A. A spike. *B*. Raceme. *C*. Corymb. *D*. Umbel. *EF*. Heads.

shortened and thickened, the *receptacle*. All forms of inflorescence are referred to two types, or to a combination of the two. These plants are known under the following names: (1)

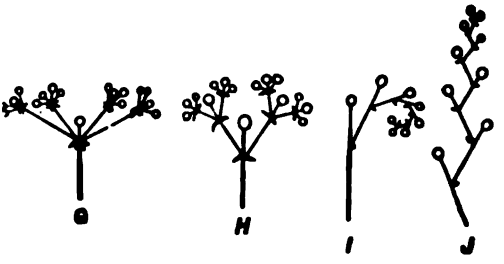


FIG. 2.—DEFINITE INFLORESCENCES.

GH. Cymes. *I*. Helicoid cyme. *J*. Scarpioid cyme.

indefinite, *indeterminate*, or *centripetal*; (2) *definite*, *determinate*, or *centrifugal*; (3) *mixed*, in which the main axis develops in one way and the separate flower clusters in the other.

Influen'za, infectious, epidemic, febrile disease, characterized by a variable degree of constitutional disturbance, especially nervous depression, and having a local expression in irritation and catarrhal inflammation of the air passages and their appendages. In France it is termed *la grippe*, indicating the sudden, precipitate onset of the epidemic and of the individual attack. It is also termed epidemic catarrh, epidemic bronchitis, and epidemic catarrhal fever. It is described as first prevailing in Europe in the tenth century, and later in the years 1311, 1387, and 1403; but its certain and undoubted record begins with the epidemic of 1510, and in this epidemic the disease for the first time appeared in the British islands. Influenza is not confined to man, but often extends its epidemic influences to the domesticated animals, especially the horse, and is known as pinkeye, "*the epizoötic*." In England the epidemics of 1728, 1732, 1733, 1737, 1743, 1803, 1831, 1837, 1847–48, and 1889–90, were accompanied by epizoötics among cows, horses, and dogs. The pestilential epizoötic

extending throughout the U. S., 1872–73, attacking in New York 16,000 horses, was an outbreak of influenza, prevailing with less severity among men.

A bacillus (Pfeiffer's bacillus) has been described as producing the disease. There is also a milder form of *grippe*, known as catarrhal fever. Influenza has no pathology indicative of its specific nature. The majority of cases are mild and require no treatment beyond care. More marked cases may require a preliminary purgative, a low diet, the avoidance of exposure to cold and sudden changes of temperature, resort to hot draughts, as of lemonade, to stimulating foot baths, to the use of Dover's powder, spiritus Mindereri, or other remedies to secure free perspiration, and the relief of bronchial congestion by inhalation of steam, by ammonia, or by stimulating expectorants. The direct mortality from *grippe* is low, which is fortunate, as the disease will often attack forty per cent of the population. But its debilitating effects are far reaching, and may lead to pneumonia, appendicitis, heart complications, and nervous depression resulting even in dementia.

Informa'tion, in law, a written charge or accusation against an alleged offender, stating some violation of law, made before a court of competent jurisdiction to try the same. This process has taken the place of the ancient writ of *quo warranto*. It is filed by an attorney of the state or U. S., or other competent law officer, at his own discretion. Informations are sometimes filed for public purposes; but oftener, in the U. S., by some private prosecutor, to ascertain his rights or obtain redress. Although criminal in form, they are in their nature civil proceedings. When they are moved by a private person for his own purposes, he is called the relator. The general purpose of informations is to inquire into alleged usurpations of, or intrusion into, or unlawful claim or exercise of official or corporate powers or franchises. In many of the U. S. an information is now substituted for an indictment, and the rules governing indictments are there applicable.

Inform'er, in law, a person who brings suit or prefers an accusation against another for the violation of some penal statute. It is sometimes provided in a statute of this kind that the whole or a certain portion of the penalty recovered from the person who shall be convicted of violating its provisions shall be given to anyone who will sue for the same, or who will give information of the offense to the proper prosecuting officer. The party by whom the proceeding may be instigated is sometimes termed not merely "informer," but "common informer," because he may be any member of the community. The object of such legislation is to elicit the active efforts of the people generally in the detection and punishment of wrongdoers by the prospect of a reward, and the person who furnished the information which led to the beginning of the prosecution is entitled to the share in the penalty recovered, and not one who afterwards furnishes information on which conviction is had in proceedings so instigated.

Infuso'ria (so called because first found and studied in infusions of hay, pepper, etc.), term sometimes loosely used to include all minute organisms occurring in infusions, stagnant water, etc., but when properly restricted it is given to a class of animals consisting of one cell (Protozoa) characterized by a permanent and definite body form, in which certain regions are set aside for the performance of definite functions. Thus there is usually a fixed

INFUSORIA (*Epistylis nutans*).

area for the taking of food, a contractile vacuole for the excretion of waste, definite organs of locomotion, and in some cases a differentiation of muscular portions. All the Infusoria are microscopic; they occur in both salt and fresh water, while several occur as parasites in other animals, sometimes as concomitants if not actual producers of disease. Reproduction occurs by division, by budding, and by a peculiar process known as spore formation, previous to which the animal retracts all protruding portions of its body, and incloses itself in a protective case or cyst. Three subclasses are recognized, *Flagellata*, *Ciliata*, and *Suctoria*.

Infusor'ial Earth, geologic formation composed of the remains of diatoms. These minute bodies occur in many formations, and there are certain local strata of Tertiary age composed entirely of them. Consisting of sharp, angular, siliceous grains of microscopic size, they constitute a valuable abrasive material, and are extensively used for scouring and polishing, and also in the manufacture of dynamite, etc. In the U. S. there are important deposits in Virginia, Maryland, New Jersey, Connecticut, New Hampshire, Nevada, California, and Oregon.

Ingelow (In'jĕ-lō), **Jean,** 1820–97; English poet; b. Boston, England; led a quiet, uneventful life till 1863, when the publication of her "Poems" secured her immediate recognition as a poet of high rank. Her subsequent publica-

tions include "Tales of Orris," "Studies for Stories," "Poor Matt," "Stories Told to a Child," "A Story of Doom, and other Poems," "A Sister's Bye-Hours," "Mopsa the Fairy," "The Monitions of the Unseen, and Poems of Love and Childhood," "Off the Skelligs," "Fated To Be Free," "Don John," and "Sarah de Berenger."

Ingemann (ing'ē-mān), **Bernhard Severin,** 1789–1862; Danish author; b. Falster; most celebrated works are his epics "Waldemar de Store" and "Holger Danzke," his national anthem "Danebrog," and his sacred songs; also published novels and tales, dramatic poems, ballads, songs, and fables.

Ingenhousz (ing'gēn-hows), **Johannes,** 1730–99; Dutch physician; b. Breda; 1768, inoculated in Vienna the children of the imperial family, and was made aulic councilor and imperial physician; after 1776 practiced in England, and contributed to the "Philosophical Transactions." To him are ascribed the first medical use of carbonic acid, the invention of the plate electrical machine, and the discovery that plants when exposed to light exhale oxygen.

Ingersoll (ing'gēr-sūl), **Robert Green,** 1833–99; American lawyer and author; b. Dresden, N. Y.; began practice of law in Illinois, 1854; defeated as Democratic candidate for Congress, 1860; became colonel Eleventh Illinois Cavalry, 1862; attorney-general of Illinois, 1866; in National Republican Convention, 1876, made notable speech nominating James G. Blaine for President of the U. S., calling him "the plumed knight"; declined mission to Germany, 1877; practiced law in New York from 1882 till his death; widely known as an orator of great eloquence; prominent also as an atheist; numerous publications include "The Gods, and Other Lectures," "Ghosts," "Some Mistakes of Moses," "What Shall I Do To Be Saved?" "The Liberty of Man, Woman, and Child," "Prose Poems," "A Vision of War," a funeral address over his brother Eben's grave, also one over a child's grave.

Ing'ham, Benjamin, 1712–72; American religious leader; b. Ossett, England; became associated with John and Charles Wesley, the founders of Methodism; was ordained and accompanied John Wesley to Georgia, 1735, remaining two years in America, returning with Wesley, and accompanying him in his visit to the Moravians in Germany; founded in Yorkshire several congregations of what might be called Moravian Methodists, otherwise "Inghamites," and in a few years there were in England eighty-four of these societies; removed to Aberford and evangelized the whole surrounding region, being elected a bishop or *general overseer* by the church he had founded, which was long in fellowship with Methodism, but, 1759 and the succeeding years, three fourths of the societies, and finally Ingham himself, went over to the Sandemanians.

Ing'oldsby, Thomas. See BARHAM, RICHARD HARRIS.

Ingraham (ing'grā-ăm), **Duncan Nathaniel,** 1802–91; U. S. naval officer; b. Charleston, S. C.; entered the navy, 1812; rose to the rank of captain, 1855, and rendered himself famous in the Martin Koszta affair at Smyrna, 1853; for his conduct in this matter was voted thanks and a medal by Congress; chief of the Ordnance Bureau of the Navy Department, 1856–60; resigned his commission in the U. S. navy and took service under the Confederate states, rising to the rank of commodore.

Ingres (ăngr), **Jean Dominique Auguste,** 1780–1867; French painter; b. Montauban; studied under David and in Italy; was for some years director of the French Academy in Rome; 1862, was made a Senator; was the chief of the modern classic school. His numerous works, comprising generally serious historical and classical subjects, filled an entire compartment in the exhibition of 1855. His "Apotheosis of Homer" is on a ceiling in the Louvre, and his "Apotheosis of Napoleon I," on the ceiling of the Hôtel de Ville.

In'grains, tribe in the Russian government of St. Petersburg, belonging to the Tchudic branch of the Finns, now reduced to about 15,000, in small and wretched villages. They derive their name from the river Inger, or Izhora. The strip of land between the Neva, the Lake of Ladoga, the Gulf of Finland, the Narva, and the governments of Pskov and Novgorod was called Ingermannland, or Ingria, by the Swedes. It has formed since 1783 the bulk of the government of St. Petersburg.

Inher'itance Tax, a tax assessed on estates inherited by lineal or collateral heirs. Taxes on legacies and successions belong to the same general class of taxation, and are commonly treated with them. Such taxes are now in force in nearly all the countries of Europe and in many of the states of the U. S., and constitute a certain and economical source of revenue. Laws relating to taxes on inheritances and legacies are found as early as the time of the Romans, and the origin of the collateral inheritance or succession tax of Europe and the U. S. is traceable to the Roman civil law. Under the reign of Augustus a tax of five per cent was placed for the support of the Roman army on all legacies or inheritances of a certain value; but the tax was not exacted from the nearest relatives on the father's side. In England a duty of five shillings was imposed, 1694, on all probates of wills and letters of administration, and this was increased to ten shillings, 1698. This tax, however, was rather analogous to the present stamp duties, and the first inheritance or legacy tax proper was one on legacies of personal property, imposed 1780. Such taxes exist in most of the states of modern Europe, including Germany, Austria, France, Switzerland, Holland, Russia, Italy, Spain, Greece, Denmark, and Sweden, and are also imposed in Canada and the Australian colonies of England, and exist in some of the states of S. America and Central America, including Chile and Guatemala.

In the U. S. legacy and succession taxes were imposed on real and personal property by various acts of Congress during the Civil War,

but these laws, with their amendments, were repealed by the act of 1870. The first state of the U. S. to pass an inheritance tax was Pennsylvania, which, 1826, enacted a statute imposing a tax on collateral inheritances. This act was modified and added to from time to time by amendments until, 1887, the entire subject was codified in a new act, which is substantially a reënactment in a systematized form of the previously existing laws. The majority of states now impose the tax, variously regulated. In Louisiana a legacy tax was imposed, 1828, but was repealed, 1877; in Maryland such taxes have existed since 1864; in Virginia since 1844; in N. Carolina since 1846 (apparently repealed, 1883); in Delaware since 1869; in Connecticut since 1889; in W. Virginia since 1887; in New York since 1885; in Maine since 1893; in Massachusetts since 1891; in New Jersey since 1892; in Ohio since 1893; in California since 1893; in Tennessee since 1891, and in Illinois since 1895. In Canada succession and inheritance taxes and duties were introduced in the provinces of Quebec, 1892; Ontario, 1892; Nova Scotia, 1892; Manitoba, 1892, and British Columbia, 1894. See TAXATION.

Inhos'pitable Sea, name once applied to the Black Sea, because of the manners of its coast inhabitants.

Ini'tiative and Referen'dum. See REFERENDUM.

Injunc'tion, in law, a prohibitory writ. Courts of equity grant relief by injunction in those cases in which, but for their interposition, an equitable right would be infringed. An injunction is a writ commanding an act which the court regards as essential to justice, or restraining an act which it esteems contrary to equity and good conscience. Relief is thus afforded to rights wholly equitable, or, under the peculiar circumstances, incapable of enforcements in the courts of law. This happens, for example, where trustees are enjoined from using their legal title to oust those equitably entitled to the enjoyment of the estate, and where a mortgagor in possession, who is not punishable in the courts of law for committing waste, is yet restrained in equity from doing so. A second class of cases includes those involving an equitable element, but the matter of which is otherwise cognizable at law. Thus, when fraud, accident, or mistake has given one party an unfair advantage over his opponent, an equity arises in favor of the latter, which will be protected by injunction. Injunctions may be temporary, when they are granted for a limited time pending the suit, or permanent, when the plaintiff has established his right to such relief upon the hearing of the cause. Disobedience of an injunction is a contempt of court, punishable as such.

Ink, preparation for making colored letters in writing or printing. The ink of the ancients appears to have been similar to the solid Chinese or India ink—a combination of three parts of lampblack with one of glue or gum. The requisites of a good writing ink are permanence, close adherence to the paper, a good color, no tendency to mold, and a proper consistency. A combination of nutgalls with sulphate of iron was long the only suitable black solution known. The galls contain four vegetable substances, *viz.*, gallic and tannic acids, mucilage, and extractive matter. The more nearly ink approaches the composition of a gallate of iron, the more permanent it is. The recipes for this class of ink alone are numerous. One for a fine black ink is: Aleppo galls, 12 lbs.; sulphate of iron, 4 lbs.; gum arabic, 3½ lbs.; water, 18 gals.; the bruised galls to be exhausted by three successive boilings, each time with a reduced quantity of water; the decoction is strained, and while warm the solution of gum and copperas, also warm, is to be added, and the mixture is left for several weeks to deposit its sediment. A few drops of creosote added will prevent moldiness.

Copying inks, which are intended to give an impression of the writing made with them to a second or a third sheet moistened and pressed on the original, are the ferro-gallic inks with a larger proportion of gum than they usually contain, and a portion besides of sugar. Red ink may be made by boiling 2 oz. of Brazil wood, ½ oz. alum, and the same of crystals of tartar, in 16 oz. of pure water, till the water is reduced one half; in the strained liquor ½ oz. of gum arabic is to be dissolved, and a tincture added made by digesting 1½ drams of cochineal in 1½ oz. of alcohol. Sympathetic inks are preparations which when used for writing leave no visible, or at least only colorless, marks on the paper. These are afterwards brought out in colors by exposure to heat or to moisture, or by application of other substances. The materials of the common ferro-gallic inks may be used separately for a sympathetic ink, the writing being done with the sulphate of iron solution and washed over with that of the galls, as the writing of some old manuscripts is now occasionally restored. A dilute solution of chloride of copper used for writing is invisible until the paper is heated, when the letters are seen of a beautiful yellow, disappearing with the heat that developed them. The salts of cobalt, as the acetate, sulphate, nitrate, and chloride, possess a similar property, the letters appearing blue. The addition of a salt of nickel renders them green.

Printing ink is a preparation very different from any of the inks used for other purposes. It should be of a soft adhesive character, readily attaching itself to the surface of the types, and as easily transferred to the paper pressed upon them, conveying in a clear tint the exact stamp. Its ingredients must not be of a corrosive nature to injure the rollers employed in spreading it. The usual materials employed in its manufacture are linseed oil, rosin, and coloring matters. For the best inks the linseed oil is selected of the purest quality, and this is clarified by digesting it for some hours with dilute sulphuric acid at a temperature of 212°, and then washing it with hot water; it will then dry much more quickly. The oil is then boiled. For letterpress printing, soap should be added to the materials to enable the ink to be taken up clearly from the types without smearing. Lampblack is almost always em-

ployed as the coloring matter. Other carbonaceous blacks reduced to impalpable powder are sometimes employed. For colored inks various pigments are introduced instead.

Inkerman', small Tartar village in the Crimea, near the E. extremity of the harbor of Sebastopol; is built on the ruins of an ancient city, supposed to be the *Ctenos* mentioned by Strabo, at the foot of a perpendicular hill, which rises several hundred feet above the valley of the Tchernaya River, and is covered with remains of walls and towers, while in the sides are numerous caves hewn in the solid rock, with traces of altars, chapels, and paintings. The heights of Inkerman opposite to this hill, across the valley of the Tchernaya, are memorable as the scene of one of the most desperate battles of modern times (November 5, 1854), in which 14,000 allied British and French troops (chiefly the former) held their ground for many hours against 60,000 Russians, ultimately driving them from the field with great loss. The action began early in the morning by the Russians attempting to carry the allied positions by assault. The fifth volume of Kinglake's graphic "History of the Crimean War" is entirely occupied with the battle of Inkerman, which is commonly known as "The Soldiers' Battle."

Inlay'ing, ornamentation of surfaces of wood, metal, shell, stone, etc., by the insertion of pieces of a different color, generally made level with the general surface, but sometimes in slight relief. Marqueterie, damaskeening, mosaic work, etc., are forms of this art. Russia, Italy, and India are the most important seats of the inlayer's art. A kind of minute and elaborate work inlaid in geometrical patterns on wood, and called Bombay work, comes from India. See MOSAIC.

In'man, Henry, 1801–46; American painter; b. Utica, N. Y.; best works are portraits, and include those of Bishops McIlvaine and White, Dr. Hawks, William Wirt, Nicholas Biddle, Horace Binney, Audubon, Chief Justice Nelson, De Witt Clinton, Martin Van Buren, and William H. Seward; other subjects are "Birnam Wood," "Rydal Water," "Lake of the Dismal Swamp," "Trout Fishing," "The Newsboy," "Rip Van Winkle Awaking," and "Scene from the Bride of Lammermoor."

Inn (anc. *Œnus*), river of Europe, one of the principal tributaries of the Danube; rises in Grisons, Switzerland, W. of Mt. Bernina, at an elevation of nearly 7,000 ft., flows through the beautiful Engadine valley and the Upper and Lower Inn valleys in Tyrol, then N. and E. for about 90 m. through Bavaria, then N. from Braunau, forming the boundary between Bavaria and Austria, and joins the Danube at Passau, after an entire course of 315 m. It is navigated by steamboats from Innspruck. Its largest tributary is the Salzach, also navigable.

In'ness, George, 1825–94; American landscape painter; b. Newburg, N. Y.; was almost wholly self taught; lived in Italy, chiefly in Rome and Florence for some time; later near Boston, and in New York, but spent the years 1871–75 in Italy. His "American Sunset" was exhibited as a representative work of American art at the Paris Exposition of 1867. Other works include "A Vision of Faith," "A Passing Storm," "Light Triumphant," "View near Rome," "Italian Landscape," "Under the Green Wood," "Durham Meadows," "Delaware Water Gap." He ranks as one of the great American landscape painters.

Inn'keeper, in law, one who conducts his house as a place of entertainment for all who choose to visit it as transient guests. Inn, hotel, and tavern are generally treated by the courts as synonymous, unless a statute gives to one of them a peculiar signification. An innkeeper is liable as an insurer of the property of his guests within his charge against everything but the act of God or the public enemy, or the negligence or fraud of the owner of the property. No especial delivery of the goods to the innkeeper is necessary to charge him, if they are in his custody in the usual manner; but he may protect himself by requiring reasonable precautions from the guest, as that he shall deposit money or jewelry in a particular place for safe-keeping. It is held that he cannot refuse to receive a guest without good cause. An innkeeper is not only liable like any other person for loss or injury caused by his own default or negligence, but also for the loss of or injury to property of a guest, without the innkeeper's own default of any kind. As against these liabilities, he has a lien on the goods of his guest for charges, but no lien on his person.

In'nocent, name of thirteen popes, the most important of whom follow: INNOCENT I, SAINT, d. 417; b. Albano; succeeded Anastasius I, 402; interceded without success in behalf of the patriarch Chrysostom, who was deposed from his see and banished; prevailed on Honorius, Emperor of the West, to persecute the fanatic Donatists; made exertions to save Rome from Alaric and his Visigoths, who nevertheless sacked that city, August 24, 410; condemned the doctrines of the Pelagians and the Novatians; first practiced the system of sending legates to represent the papal see in remote districts; was vigorous in maintaining the right of his see to exercise appellant jurisdiction over other bishopries, and enforced the celibacy of the clergy; succeeded by Zosimus; day, July 28th.

INNOCENT II (GREGORIO PAPARESCHI), abt. 1090–1143; b. Rome; succeeded Honorius II, 1130. Peter de Leon was put forward as pope by a minority of the electoral body under the title of Anacletus II. Innocent was driven from Rome; went to Cluny in France, and was recognized by the monarchs of France, Germany, and England; was supported by St. Bernard and by the Council of Reims; was forcibly restored to power at Rome by Lothaire, whom he crowned emperor in the Church of St. John Lateran, 1133; was again driven from Rome the same year; held a council at Pisa and excommunicated his rival; was again restored by Lothaire, 1137, and was finally recognized by the rebellious cardinals after the death of

Anacletus, 1138. Innocent convoked, 1139, the second Council of Lateran, attended by 1,000 bishops; condemned the opinions of Arnold of Brescia and of Abelard (1140); pronounced an interdict on the kingdom of France; and had his temporal authority overthrown by an insurrection of the Romans, who restored the senate and the tribunes of ancient Rome; succeeded by Celestine II.

INNOCENT III (LOTARIO CONTI), 1161–1216; b. Anagui; succeeded Celestine III, 1198; enlarged the papal temporalities; twice dictated the election of the German emperor; greatly diminished German authority in Italy; excommunicated Philip Augustus of France, and placed the kingdom under an interdict, 1200; afterwards visited the same fate on Spain and Portugal, on account of the illegal marriages of the kings of France and Leon; compelled King John of England, by the same means, to give up the right of investiture, while the latter made his possessions the tributary fief of Rome; sustained the suzerainty of the papal see over Sicily, and received the homage of Aragon, Hungary, Poland, Norway, and Dalmatia, who submitted to his arbitration their temporal dissensions; approved the Franciscan and Dominican orders; annulled Magna Charta, 1215, though his legate recognized it in the following year, and excommunicated the English barons; sent out the crusade which founded the Latin empire at Constantinople; convened the fourth Lateran Council, 1215; succeeded by Honorius III.

INNOCENT XI (BENEDETTO ODESCATCHI), 1611–89; b. Como; succeeded Clement X, 1676; undertook to revive the ancient discipline of the Church, and had quarrels with Louis XIV about the revenues of vacant benefices (1678), in which that monarch was supported by a general assembly of French bishops, who declared (1682) the authority of the pope inferior to that of a General Council. Innocent thereupon held a consistory, in which he condemned the Gallican propositions, and compelled their implicit withdrawal by refusing to confirm the bishops who accepted them. In 1687 he published a brief abolishing the right of asylum as formerly exercised by foreign ambassadors; refused to receive the French envoy, who maintained that right and entered Rome with a military escort; sanctioned the condemnation by the Inquisition of Molinos's doctrine of Quietism; joined the League of Augsburg.

In'nocents' Day (in Old English, *Childermas*), the day (December 28th) on which the Roman Catholic and Anglican churches celebrate the massacre of the children at Bethlehem, who are called the *Holy Innocents* and considered as the earliest Christian martyrs, it being the teaching and belief of the Church that the shedding of blood for Christ takes the place of baptism. Among the Greeks this feast, known as that of the "14,000 holy children," is observed on December 29th.

Inns of Court, colleges in London in which law students reside and pursue their studies. In England, from an early period, lawyers and law students have dwelt and studied in the vicinity of the courts. In 1346 the Knights of St. John of Jerusalem leased the buildings and gardens of the Templars in London to students of the common law. The place continued to be called the Temple, and in a few years the number of inns increased to four, which still exist, *viz.*, the Inner Temple, the Middle Temple, Lincoln's Inn, and Gray's Inn, each of which contained 200 members. By virtue of grants from James I, made 1608, the buildings of the two temples are still held by an incorporated society of the "students and practicers of the laws of England." In the hall of the Inner Temple dinner is prepared for the members of the inn every day during term time. Students must keep twelve terms, that is five years, at the inns of court, before they are entitled to be called to the bar, and those of the Inner Temple are required to dine in this hall at least four times in each term. The chambers of this inn are chiefly occupied by chancery barristers and conveyancers, and the Court of Chancery is held in its hall.

Inns'bruck, or Inns'pruck, capital of the Tyrol, Austria; situated on the Inn, 1,800 ft. above the level of the sea, and encircled by mountains from 6,000 to 8,000 ft. high. The five suburbs which form the new part of the town are finely laid out and well built. The cathedral contains the celebrated monument of Maximilian I, of marble and bronze, and also that of Andreas Hofer. Innsbruck has a university, a museum, a botanic garden, and extensive manufactures of cloth, silk, gloves, and stained glass. Pop. (1900) 27,056.

I'no, in Greek mythology, a daughter of Cadmus and Harmonia; was secretly married to Athamas, King of Orchomenus, to whom she bore two sons, Learchus and Melicertes. Having accepted from Hermes the young Dionysus to nurse, Here visited her and her husband with madness, when Athamas slew Learchus. Ino fled with Melicertes in her arms and leaped into the sea, where she was changed into a sea goddess, Leucothea. As the myth of Ino was much used by the Greek dramatists, it received many enlargements and augmentations, and exists in many different versions.

In'nuits, native name of the supposed original inhabitants of the coast line of Alaska and the adjacent islands, with the exception of small territories on Cook's Inlet and at the mouth of Copper River. Their descendants are a finer race physically than the Eskimos of Greenland and Lapland; are accomplished navigators, fishermen, and seal hunters; and, excepting those in S. Alaska, do not take kindly to civilizing influences.

Inocar'pus Edu'lis, stately evergreen tree of the Pacific islands, and of the family *Thymelæaceæ*, producing a nut which after roasting is a palatable and important food. The tree puts out from its trunk curious planklike buttresses, which are very convenient to the natives for use as natural boards. Some of these planks are 4 ft. wide at the base.

Inocula'tion, in general, the intentional or accidental conveyance of disease to an individual by means of the actual application of

morbific material to his person, especially on a wound; in particular, it signifies such a transfer of variola, or smallpox. See IMMUNITY; INFECTIOUS DISEASES; SMALLPOX; VACCINATION.

Inouye (ē-nō-ō'yā), **Kaoru** (Count), 1839– ; Japanese statesman; b. province of Choshu; made a secret journey to Europe with Marquis Ito; was convinced that the future greatness of Japan lay in the adoption of Western civilization; with Ito advocated the new policy at the risk of life; was almost continuously in office after 1868; succeeded Ito as Minister of Public Works, 1878; soon afterwards spent seven years in the Foreign Office; became Minister of the Interior, 1892; special ambassador to Korea, 1895; subsequently was minister to Germany, and was raised to the rank of ambassador there, 1906.

Inquisi'tion, or Ho'ly Of'fice, tribunal established in various Roman Catholic countries to search out and to try persons accused of heresy or other offenses against the canons of the Church, or against morality. Laws against heresy, of which the penalty was death, were enacted under Theodosius I, 382, and under Honorius, 398. For several centuries all cases of heresy came before the ordinary courts, but in the course of time the examination of the charge of heresy devolved on bishops, who handed over those who remained obdurate to the secular courts for punishment. At the beginning of the thirteenth century Innocent III sent legates to the S. of France to incite a crusade against the Albigenses, and to assist the bishops in searching out the heretics. The fourth Council of Lateran, 1215, enjoined on the synodal courts the searching out and suppression of heresy, and may therefore be regarded as having established the legal foundation of inquisitorial courts. The Synod of Toulouse (1229) issued on this point forty-five propositions, enjoining on princes and bishops the discovery and punishment of heretics. To aid the bishops, many of whom were remiss, persons were sent by Pope Gregory IX to different countries, denominated collectively "Inquisitorial Missions."

The Church contented itself with the examination of the heretics, and called on the secular arm to carry the sentences into execution. If the accused denied the charges, he might be put to the torture. The property of the condemned was confiscated. Until 1248 the inquisitorial courts were only transitory tribunals; but from that date they became permanent, and were successively introduced into Italy, Spain, Germany, and the S. provinces of France. The probability of a union between the Jews and Moors against the Christians during the fifteenth century excited in Spain considerable alarm. With the primary object of searching out those who had relapsed into Judaism, or who feigned conversion, a papal bull was procured, 1478, authorizing the establishment of the tribunal there. From this date Catholic writers regard the Spanish Inquisition as a state institution.

In September, 1480, the first court was established at Seville. In 1483, Torquemada became grand inquisitor general of all Spain, and in concert with the king framed the organic laws of the new tribunal. The *auto de fé* (act of faith) was the public reading of the sentence passed on persons found guilty; but it is popularly understood of the ceremonies accompanying their execution. The prisoners were conducted to the public square, where royalty itself and all the highest personages in Church and State attended. If they remained obdurate after the publication of their sentence and the offer of a last option, they were handed over to the secular judge, and led to the *quemadero*, or place of burning. The inquisitor general was appointed by the king and approved by the pope, but he was in reality independent of both.

The expulsion of the Jews (1492) and the Moors (1500) from Spain, which many tried to evade by conversion to Christianity, and later the spreading of Protestantism, furnished the inquisition with abundant occupation. The general result of Llorente's statements, for the time from 1483 to 1808, is as follows: Burned alive, 31,912; burned in effigy, 17,659; subjected to rigorous pains and penances, 291,456. From the beginning of the seventeenth century, when it had completely exterminated Protestantism in Spain, the inquisition directed its efforts mostly to the suppression of heretical books. Charles III greatly restricted it, and Joseph Bonaparte entirely abolished it, 1808. It was restored by Ferdinand VII, 1814, but never regained its former power; and, 1835, its property was confiscated for the payment of the public debt. The most complete work on the inquisition in Spain is Llorente's "History of the Spanish Inquisition." The author declares that he was secretary of the Inquisition of Madrid, 1789–91, and had all its archives at his disposal during 1809–11. The accuracy of some of his statements is doubted by many.

The inquisition was introduced into Sicily and the Spanish colonies in America. In the latter the tribunals of Mexico, Cartagena, and Lima rivaled in severity those of Spain. The attempt of Philip II to reestablish it was among the principal causes which led to the revolt of the N. provinces and the rise of the Dutch Republic. Its organization in Portugal was nearly the same as in Spain. In Italy the inquisition never became as powerful as in France and Spain. It was introduced, 1233, against the Waldenses. A supreme tribunal of the inquisition for the whole Church, called the "Congregation of the Holy Office," was established by Paul III at Rome, 1543, but had never any authority beyond the limits of the papal states. The Roman Inquisition was the mildest of all tribunals of this nature, no instance having occurred of the punishment of death. Since the occupation of Rome by the Italian Govt., 1870, the inquisition has been abolished in Italy. The body bearing the name of "Congregation of the Holy Office" is composed of twelve cardinals, presided over by the pope. They pronounce on all questions relating to faith and morals, but have only spiritual jurisdiction. Outside of the territory of the Romanic nations the inquisition never gained a firm footing.

In Rem (Lat., "against the thing or property"), legal term used in conjunction with *in personam* (against a person) to describe a right, a proceeding, or a judgment. Rights *in rem* are those which are available over their object against everybody, while rights *in personam* are available against a definite person or persons. The owner of a horse has the right to its exclusive enjoyment. Though it may be stolen and sold for its full value to an innocent purchaser, the owner can lawfully recapture it without incurring any liability to such purchaser. If the owner sells the horse, his right to the purchase price is *in personam*, against a definite individual, the buyer. Rights *in rem* include those of personal security, of personal liberty, of private property, of immunity from fraud, and of the society and control of one's family and dependents.

Insan'ity, unsoundness of mind, including congenital imbecility and idiocy. Insanity was of rarer occurrence in ancient than in later times. Although several instances of real or feigned madness are mentioned by the ancients, their writings contain no account of any institutions devoted to the care of the insane. It is said that an institution for the insane existed at Jerusalem, 491. In the twelfth century Benjamin of Tudela says there was a large edifice at Bagdad, called "House of Grace," in which the insane were received in summer and confined in chains until they recovered or died. It was visited by the magistrates every month, and those who had recovered were discharged. Systematic writers on the subject of insanity have usually dated the commencement of reform from the labors of Pinel, who, 1792, liberated from the Bicêtre fifty-three lunatics who were in chains. The subject had received the attention of Benjamin Franklin and others in the U. S. as early as 1750. At the organization of the Pennsylvania Hospital at Philadelphia a department for the care of the insane was established, in which the system afterwards advocated by Pinel was successfully practiced.

The causes of insanity may be divided into predisposing and exciting. The more general predisposing causes relate to sex, age, social position, and education. Insanity is slightly more common in women than in men, and more common among unmarried men and married women. Cases are rare in childhood; the greatest number become insane between twenty-five and fifty. Poverty, accompanied by deprivation, hardship, and anxiety, predisposes to insanity. Heredity is one of the chief special predisposing causes, and insanity is more frequently transmitted from the mother, and especially from her to the daughters. The exciting causes of insanity may be divided into moral or psychical and physical. The principal psychical causes are grief, fright, anxiety, care, or an excited state of any passion, particularly if recurring often or prolonged; the emotions aroused by disappointment, by unfortunate love, by jealousy, by reflecting on misfortunes that have ruined the prospects of life; excessive or prolonged employment of the intellectual faculties, particularly when connected with the emotions, as the composition of poetry or romance, or the prolonged excitement attending the management of difficult legal cases. Anything which produces a disturbance of the circulation of the blood in a portion or the whole of the brain may become an exciting cause. The principal physical causes are drunkenness, want of sleep, overexertion, injuries to the head, tumors in the brain, and sometimes malarial and other diseases, as Asiatic cholera and acute rheumatism; but the results from the latter causes are usually only temporary. Among all the causes of mental disease, the excessive use of intoxicating drinks is the most frequent.

The older writers divided insanity principally into mania and melancholia. The different forms may be conveniently considered under the following divisions: 1, melancholia; 2, mania; 3, general paralysis of the insane; 4, dementia; 5, imbecility, and, 6, idiocy. Melancholia may be acute or chronic. The first stages are generally preceded by a condition called hypochondriasis, which may be considered as the mildest form of insanity. The patient's feelings are not all imaginary; there is frequently aggravated indigestion, and the skin is in an unhealthy condition. Moral treatment is often beneficial, but should always be accompanied by therapeutical measures calculated to remove pathological conditions.

When the condition more definitely styled melancholia comes on, the patient becomes the subject not only of delusions, but of hallucinations; he imagines that he is beggared, and that his family are to be thrown helpless on the world; that he is destroyed by odious diseases or is pursued by enemies; and there is almost always a disposition to commit suicide. An asylum is not indispensable for treatment, if the patient's means are sufficient to provide him with proper care. He may be benefited by travel and change of scene; but when his condition will not admit of this, a proper place, either a private house or an asylum, should be selected, and an attempt made by therapeutical and hygienic measures to restore the cerebral defect by sleep and nourishment. In many cases recovery will be observed to follow medical treatment alone, some bad cases getting well in two months. If the melancholy becomes paroxysmal, or runs into mania, the prognosis is not so favorable, as permanent pathological changes in the brain are liable to occur. The treatment consists in nourishing diet, and, during the paroxysms, the use of chloral and morphine. Constipation is to be relieved by laxatives. Warm baths are useful.

Mania is usually classified as acute and chronic. Mania, particularly where there is hereditary taint, may be brought on by grief, misfortune, or disappointment; but peculiar forms of it accompany epilepsy and general paralysis of the insane. The symptoms of acute mania are by no means obscure; there is almost always extreme mischievousness, filthiness in person, and obscenity in language; and although the patient may eat more, he grows thin rapidly. Opiates are given by some and condemned by others. The gen-

eral indications are to support the strength. The prognosis, when acute mania is not complicated with other disease, is on the whole favorable if too long a time has not elapsed since the attack.

The disease, accompanied by insanity, called general paralysis of the insane is most formidable; no instance of recovery in a well-marked case is recorded. The subjects of the disease are almost always men in the prime of life. It does not attack boys or old men, and rarely women. A general paralytic is liable to commit outrageous acts; he is often aroused to uncontrollable fury; he neglects his business, fails to keep appointments, assumes airs of great importance, imagines himself possessed of unbounded riches, and announces his intention to commit a thousand impossible acts. His hesitating speech generally shows the first effects of paralysis, although it sometimes begins in the lower extremities. The articulation becomes obstructed. The pupils of the eyes will generally be found irregular. The course of general paralysis has an average duration of about two years.

The maniacal, or second, period may last from a week to two months, and generally yields to treatment, the patient getting better, so that he is able to go about and appear like a sane man for a while. The last stage, that of dementia, is sad indeed, and it is fortunate that the disease is rapid. His appetite remains good, but the power of swallowing is greatly diminished.

Dementia in the majority of instances is the consequence of an acute attack of insanity or is incident to old age. The characteristic feature is mental weakness, shown as regards the emotions, the intellect, and the will. The former are not held under control; slight matters bring them into inordinate action, and tears are shed and laughter excited when there is no adequate cause for the one or the other. The power of application or of fixing the attention is materially lessened. The memory, especially for recent events, is weakened to an extreme degree, and the delusions of the patient, if still present, are constantly undergoing change from the impossibility of recollecting them. Volition is almost entirely abolished. The patient is altogether controlled by others.

In idiocy there is such an abnormal organization of the nervous system or arrest of development that deficiency of mind results as a natural consequence. Occasionally idiots show an excessive development of some one mental faculty, which has appeared to grow at the expense of all the rest. Among imbeciles the ability to form abstract ideas is lacking, the capacity to receive instruction is limited to but one or two subjects, and though the memory is sometimes strong, the contrary is usually the case, and judgment is practically always deficient. There is scarcely an idiot whose mental status cannot be elevated by systematic and appropriate education, though where the cranial development is small no very material progress is to be expected. Imbecility is a condition of mental weakness or defect distinguished from *idiocy* simply by the lesser degree of mental weakness. Where the degree of weakness is but slight the patient may be referred to as being only "feeble-minded." Imbecility is either congenital or acquired early in life, before the mental faculties have become developed. What is commonly referred to as the imbecility of old age should be termed *senile dementia*.

The U. S. census reported 150,151 insane persons in hospitals January 1, 1904, the ratio being 186.2 per 100,000 of population, an increase of 16.2 in the period 1890–1904 and of 2.9 in the period 1880–1904. The latest available statistics for most of the other countries point to steadily advancing ratios of the insane.

Inscrip'tions, language inscribed, sculptured, written, or impressed on clay tablets, metals, wood, stone, or other material except papyrus, paper, or other fragile substances used for books. Stone was principally used for the purpose, and rocks at the very earliest period, some nations, as the Egyptians, Assyrians, Greeks, and Romans, using inscriptions for official and other records. In the East the oldest Babylonian and Assyrian inscriptions, cut in the cuneiform or wedge-shaped characters, date as early as the oldest Babylonian (or Assyrian) reign, being that of Urukh, abt. 2000 B.C. These were continued as late as the Roman Empire, and the most remarkable is that of Darius Hystaspis at Behistun, giving an account of his subjection of the different nations and rivals to his power. It is in three kinds of cuneiform and languages—the Persian, Median, and Babylonian. Another remarkable inscription is that of Hadji Abad, in a character called Pehlevi—which later came into use in Persia—and is supposed to refer to the Parthian monarch Sapor. The inscriptions of the Egyptians are as old as the Babylonian, and are in the hieroglyphic character, the oldest known being a slab of the reign of the monarch Sent, of the second dynasty, according to some chronologists above 3000 B.C. In Egypt the use of inscriptions more extensively prevailed than elsewhere, the walls of tombs, temples, and other buildings, besides objects of use or attire, being covered with them. The most remarkable are those recording the working of the mines at Mount Sinai from the third to the eighteenth dynasty, others detailing the expulsion of the shepherd rulers or invaders, the wars of Thothmes III and Rameses II, the invasion of Egypt by the Ethiopian king Pinachi, the tablet of San or decree of the synod of priests held at Canopus 238 B.C., and the Rosetta Stone, or synodical decree of priests at Memphis 196 B.C., both of which are in three languages — Egyptian hieroglyphic, Demotic, and Greek—and which are keys to the decipherment and interpretation of the hieroglyphs.

Among the Semitic nations of Palestine inscriptions were more rarely used, and seldom of any length. Of these, the best known are the inscription on the coffin of Asmunazar, King of Sidon, and the Dhiban Tablet or Moabite Stone of Mesha, King of Moab, abt. 900 B.C., the oldest known in the Phœnician character. Numerous inscriptions are found

in the Wady Mokatteb at Sinai, supposed by some to have been the work of the Israelites after the Exodus, but now referred to a later date, about 300 B.C. or later, and attributed to the Nabatheans. Many Himyaritic inscriptions of a still later date have been found at the dyke of Mareb and Sanaa in S. Arabia, some on bronze plates which have been affixed as votive offerings to the temples of the gods. Beyond the rule of the Egyptians few or no inscriptions have been found in central and S. Africa, but at the sites of Carthage and Utica, Punic inscriptions, chiefly votive, in a Phœnician character, have been found, and at Dugga and other places, in a peculiar script called Libyan, one bilingual in both characters. Another remarkable inscription is a bilingual one in the Cypriote and Phœnician character found at Dali, dated in the reign of Melekiathon, King of Cittium and Idalium. The Jews appear not to have used inscriptions at an early period, and none are known earlier than the Christian era.

It is in Greece that inscriptions of all classes and on all objects abounded, the oldest to which a date can be given being that of Abusimbel in the reign of Psammetichus I, abt. 665 B.C. They have continued in use till the present day, and some of the most remarkable have been found at Athens; but on the whole the Greek inscriptions, although throwing considerable light on the municipal and social life of the Greeks, are not of great historical value. The Roman inscriptions, which commence with the republic about the time of the fall of Corinth, 145 B.C., continue till the extinction of the Latin language. There are also above 2000 Etruscan inscriptions, but the language has not been deciphered. In India no inscriptions have been discovered earlier than the age of Asoka, abt. 400 B.C., but in China that of Yu has been referred to 2205 B.C., although its authenticity is more than doubtful. Inscriptions of 1200 B.C., however, exist. Those of Indo China and Japan are much more recent. In America the inscribed monuments of Mexico and Yucatan are of an undefined antiquity. For palæography, the verification of history, chronology, geographical sites, the appreciation of the social and municipal condition of nations, and the relative antiquity of monuments, inscriptions are of the highest importance. See CUNEIFORM INSCRIPTIONS, HIEROGLYPHICS.

Insec'ticides and Fun'gicides, materials used to destroy insects and fungi which defoliate the plants and injure the fruit. Among the chief devices and methods for using them is the spray pump, which applies the poisonous substances in a water mist. The arsenites, in the form of Paris green and London purple, are the most prominent insecticides for biting or chewing insects, as beetles and caterpillars. For the sucking insects (the plant lice or aphides) the various kerosene emulsions are used, and for scale insects sulphur and soap washes. In the greenhouse the plant lice are usually kept in check by fumigations of tobacco. For flies in the dwelling house, pyrethrum is a common remedy.

The leading insecticides are: (1) *Paris green*, an aceto-arsenite of copper, consisting of arsenic, copper oxide, sulphuric acid. It is applied in either a wet or dry condition, but is usually much diluted. With recent machines, which distribute the material very thinly, it is sometimes applied to potatoes without dilution. Paris green is practically insoluble in water, and when so used must be kept in a constant state of agitation, else the poison will settle and the liquid from the bottom of the cask will be too strong and do serious damage, and the top will be useless. (2) *London purple*, an arsenite of lime, obtained in the manufacture of aniline dyes. It is composed of arsenic, rose aniline, iron oxide, and water, or arsenic, lime, sulphuric acid, and carbonic acid. It is a finer powder than Paris green, and therefore remains longer in suspension in water and is used in the same manner. London purple should not be used on peach trees. (3) *Kerosene emulsion*, consisting of soap—preferably whale-oil soap—hot water, and kerosene. (4) *Lye wash*, made of concentrated lye or potash water; it is used chiefly for scale insects, the bark louse of the apple, and the cabbage worm. (5) *Pyrethrum*, a very fine light-brown powder made from the flower heads of species of pyrethrum. This may be used in solution in water, dry, without dilution, or in fumigation. It may be scattered directly upon coals, or made into small balls by wetting, and then set upon coals. This is a desirable way of dealing with mosquitoes and flies. (6) *Tobacco*, used with whale-oil soap as tobacco water, in form of dust, or as fumes. (7) *White hellebore*, a light-brown powder made from the roots of the white hellebore plant (*Veratrum album*). It is applied both dry and in water. It is much less poisonous than the arsenites, and is substituted for them on fruits or vegetables which are nearly mature.

FUNGICIDES, preparations fatal to fungous diseases of plants and animals, are used for such common diseases as grape mildew, apple scab, pear scab, etc. The first application should usually be made before the leaves appear, and then applied at intervals. Most fungicides contain copper or sulphur in some form. The best fungicides for plant diseases are the following: (1) *Bordeaux mixture* (copper mixture of Gironde), composed of sulphate of copper, water, and slaked lime. This is excellent for downy mildew and black rot of the grape, blight and rot of the tomato and potato, blights of fruit. (2) *Ammoniacal carbonate of copper*, composed of carbonate of copper, ammonia water. (3) *Sulphate of copper*, which is dissolved in water in proportion of 5 to 8 lbs. of sulphur to 10 gal. of water. (4) *Sulphur*, in its dry and pulverized state; it is particularly valuable for surface mildew. In the greenhouse it may be used in fumes. Evaporate it over a steady heat until the house is filled with the vapor. It should never be heated to the burning point, as this quickly destroys most plants. It may also be used in water, in the proportion of an ounce of sulphur to 5 gal. of water.

Insectiv'orous Plants, plants which feed or subsist on insects or other small animals. It has long been known that many plants have devices by means of which they capture insects, but not until within a comparatively short period has it been known that in many cases these captures are actually used as food by the plants. One of the most remarkable of the insect - catching plants is the Venus's flytrap (*Dionæa muscipula*) of N. Carolina, whose leaves close instantly, like miniature rat traps, when certain irritable hairs on their upper surface are touched. The captured fly is held until its soft parts have been digested and absorbed by the leaf, when the latter opens again. An allied plant, drosera or sundew, effects its captures by the aid of bristles which are somewhat sensitive, and have at their glandular tips drops of a glutinous exudation. This insect lime holds its victim while the surrounding tips converge toward the insect. Pitcher plants of different families attract insects to the open mouth of their hollow leaves. The mouth is guarded by short, stiff needles which point downward. Over these the descent of the insect is easy, a return difficult. In the liquid of the hollow leaf insects are drowned, and soon decompose. That the liquid thus enriched serves as food for the plant is not proved, but is probable. Minute animals in water are entrapped by the leaf appendages of bladder wort. The stomach-shaped sacs have a mouth provided with delicate hairs which converge within to form a funnel. Through this guard minute organisms can pass in, but not readily out.

California Pitcher Plant.

East Indian Pitcher Plant.

In'sects. See Entomology, and the names of the orders and of important species of insects.

Insol'vency. See Bankrupt.

Inspira'tion, term variously used with reference to Scripture, grounded upon such passages as II Timothy iii, 16. The Christian reverence for Holy Writ was preceded by the Jewish regard for the very words of the sacred books. It was first employed to express the entire divine agency operative in producing the Scriptures. Throughout the whole preparation of the material to be written and of the men to write it; throughout the whole process of gathering and classification and use of the material by the writers; throughout the whole process of the actual writing; divine influences of the most varied kinds have been at work, extending all the way from simply providential superintendence and spiritual illumination to direct revelation and inspiration and entering into and becoming incorporated with the human activities producing Scripture in very various ways—natural, supernatural, gracious, and miraculous. "Revelation" and "inspiration" are sharply distinguished from each other; the former denoting the divine activity in supernaturally communicating to certain chosen instruments the truths which God would make known to the world; while "inspiration" denotes the continued work of God by which—his providential, gracious, and supernatural contributions being presupposed—he wrought within the sacred writers in their entire work of writing, with the design and effect of rendering the written product the divinely trustworthy Word of God.

Since the beginning of the nineteenth century much vogue has been given to two theories of limited inspiration; that only the mysteries of the faith—*i.e.*, things undiscoverable by the unaided vision—are inspired, and the other that the Bible is inspired only in matters pertaining to faith and practice. The theory of partial inspiration holds that some portions of the Bible are inspired and others not; the line being sometimes broadly drawn between the Old and the New Testament. The theory of graded inspiration is that all parts of the Bible are inspired, but some portions of it are more inspired than others. The doctrine of plenary inspiration is that God is the responsible author of the Scriptures in all their parts, in all their elements, and in all their statements of whatever kind; and they are the Word of God written, and as such are infallibly true and divinely authoritative in all their declarations. See Bible; Revelation.

In'stinct, complex inherited reactions of an animal organism directed to an end, and stimulated from the environment. Instincts are distinguished from impulses which originate within the organism. Two great characters seem to attach to instinct: first, they are considered a matter of the original endowment of an organism, and, further, they are thought to exhibit the most remarkable evidence in nature of the adaptation of organisms to their living medium. Ordinarily, instinct is not under voluntary control. Here instinct differs from impulse. Instincts are, as a rule, definite and uniform; they lack the idiosyncratic and individual variations of impulse. Instincts do not carry consciousness of the effects which they work. The hen, when she first "sits" on her nest, has no picture of her future brood, and no purpose to hatch her dozen eggs. In

saying she has an instinct to "sit" we mean that when her organic condition (warmth, etc.) is so adjusted to the environment (nest, eggs, etc.) that hatching will ensue, she sits by a necessity of her reflex nervous organism. So we cannot say that migratory birds have a picture of the country to which they fly for the first time, or an anticipation of the congenial warmth of a S. clime; all we can say is that, atmospheric and other conditions acting as stimuli, the bird's migratory instinct shows itself as an appropriate motor reaction.

Apart from the original fact of adaptation, its complexity, extending often over great periods of the creature's life, is the most extraordinary aspect of instinct. The entire life of some creatures is a round of instinctive adaptations to conditions of temperature and atmosphere. Witness, further, the social life of bees and ants and their organization for effective common labor, etc. This general theory of instinct is further strengthened by the fact of variability, possible modification, or entire loss of an instinct by reason of changes in the stimulating conditions. The child loses the power of sucking after he has been weaned; and if he relearn it, it must be by a gradual process. Birds in confinement lose the nest-building instinct. Many instinctive reactions naturally spend themselves and die away. Thus the infant's sucking instinct, the gregarious instinct in some, the bashful instinct in others.

In'stitute of France, The, organization formed in 1795 by the National Convention to take the place of the four academies which had been abolished in 1793. It was in almost all respects the heir of the older associations. (See ACADEMY.) In its present organization the institute is made of five district academies, etc.: (1) The Académie Française, the number of whose members is restricted to forty, popularly called the "Forty Immortals." The approbation of the academy is one of the prizes to which young authors look forward. Among the best known of its many prizes is the Montyon prize for virtue; 20,000 fr. are yearly divided among poor persons who have distinguished themselves by some specially virtuous act. Montyon also left a yearly prize to reward the publication of the book most conducive to public morality. De Tocqueville's work on American democracy is perhaps the most notable book which has received this distinction.

(2) The Académie des Inscriptions et Belles-Lettres has the distribution of various prizes.

(3) The Académie des Sciences. The most brilliant names in French science have adorned the roll of this academy.

(4) The Académie des Beaux-Arts distributes a number of prizes and has published a dictionary of the fine arts.

(5) The Académie des Sciences Morales et Politiques, suppressed in 1803, but restored 1832, discusses psychology, history, finance, law, and economics; has 40 ordinary, 6 honorary, 6 foreign associate, and 48 corresponding members.

There is a fine and rare library attached to the institute. Each member receives a salary of 1,500 fr.

Institu'tional Church, organized body of Christian believers who supplement the ordinary methods of preaching, prayer meetings, Sunday-school, and pastoral visitation by a congeries of institutions which touch the people on the physical, social, and intellectual sides, and thus draw them within reach of Christian truth. Institutionalism is based on the opinion that the human mind could hardly conceive of a more perfect philanthropic machine for cleaning up the misery and vice of a great town than its network of churches, provided each church, in a systematic way, undertook to cope with the circumjacent evils and needs. The institutional church is an attempt to ameliorate hard conditions, by supplementing ordinary methods with social, educational, and philanthropic institutions, by which the church will persistently and systematically show its kindness and affection by interesting itself in every department of the life of the people.

In'sulator, any substance which offers great resistance to the passage of electricity. The most important insulators are dry glass, nearly all resins and vegetable gums, silk, quartz, also oils and many other liquids, and at ordinary temperatures, the gases.

Insur'ance, in its most general definition, a contract whereby one agrees, for a sum of money, to indemnify another in case the latter shall suffer loss by certain specified risks. In a broad sense it comprises the insurance of property, including fire (usually embraces lightning with ordinary causes), marine, and cyclone or tornado; insurance of life; insurance of health (including protection against accidents); insurance of personal fidelity; and insurance in a considerable number of miscellaneous forms, such as plate glass, steam boilers, real estate titles, etc. Each of these classes is subdivided into a long list of distinctive forms, so that almost every person and thing can be brought under the protection of insurance. Insurance was known to the ancients, but had its principal development in the exigencies of modern commerce. It was first applied to mercantile adventures. The fear of pecuniary ruin by the loss of ship or cargo checked the spirit of enterprise. Few were so wealthy as to be able to bear alone so great a loss, but by dividing the risk among many it was seen that the inconvenience to each of the proportion of loss which he assumed might become trivial. Thus originated the practice of insurance. Though known and practiced among the commercial communities of S. Europe at a much earlier period, it was a comparative novelty in England in the time of Elizabeth. During the nineteenth century, however, it received an immense development.

ACCIDENT INSURANCE is a provision for indemnity for loss of time or productive power for injuries through external and accidental means, the amount payable being determined by the severity of the injury. As early as 1541 in the sea laws of Wisby mention is made of the practice of insuring the lives of shipmasters

against the peril of the sea; and in 1665 the Dutch republic announced a scale of recompense for soldiers disabled in war. But accident insurance proper dates from 1848, when The Railway Passengers Assurance Company, in Great Britain, was organized, and 1850, when The Accidental Death Insurance Company issued the first policy providing compensation for bodily injuries occurring from any accidental or violent cause not occasioning death. In the U. S. The Travelers Insurance Company, organized 1863, was the first to undertake successfully accident insurance. Professional and business men, exposed to little hazard, are insured at the lowest rate; but every year, even of this preferred class, one in fifteen sustains injuries.

FIRE INSURANCE.—In the U. S. fire insurance proper is provided by fire, marine, and fire and marine companies, and these may be stock or mutual companies. The policies of all large companies are practically identical. The principles which underlie a fire- or marine-insurance contract are substantially the same to whatever subject-matter they may be applied. Its fundamental principle is indemnity for loss, as distinguished from an agreement to pay a fixed sum absolutely, as in the case of life and accident insurance; and so far as it is made the means of accomplishing more than this it passes over into the domain of speculation and leads to the mischiefs of gambling. It is a personal contract—insuring not the thing, but the person interested in its preservation, against loss to him by reason of injury to it, and is not transferable without the consent of the insurer. The person who undertakes to pay in case of loss is termed the insurer; the danger against which he undertakes, the risk; the person protected, the insured; the sum which he pays for the protection, the premium; and the contract itself when reduced to form, the policy.

Whoever owns property, whether by an absolute or qualified, legal or equitable title, or any interest in property, or has upon him the duty or in him the right to protect and preserve it, may insure it to the extent of his interest or liability, provided he can find an insurer who is willing to assume the risk. The owner of a vessel or house, the mortgagee or lessee, executors, administrators, and trustees, common carriers and bailees generally, consignors, supercargoes, whose compensation depends upon the success of the voyage, or under instructions to land goods and wait for a market, captors and salvors having a well-founded expectation of an allowance out of the property captured or saved, and sheriffs and other officers of the law having the care and custody of property, may severally insure their respective interests. In marine policies, unless restricted, the risk extends to all losses proximately caused by the perils of the sea—that is, all losses which happen fortuitously from the extraordinary action of the winds and waves, stranding, collision, lightning, and other like natural and unavoidable accidents connected with navigation. Besides these perils, it is usual in marine policies to insure against loss by fire, barratry—i.e., the fraudulent misconduct of the master or crew—theft, piracy, capture, arrests, and detentions.

All losses directly attributable to the risk insured against come within the sweep of the policy unless there be an exception stated in the policy itself. Damage by fire may happen without actual ignition, as by cracking of glass, or the blistering of pictures, or the scorching of paint, or heating and thus destroying the value of certain articles of commerce. Damage by fire produced by lightning is within the risk, but damage or demolition by lightning without burning is not. To protect in such case the insurance must be against loss by lightning. So damage by fire resulting from explosion, as of gunpowder, for instance, is within the risk. Damages and expenses in reasonable efforts to save the insured property from destruction, as by water, removal, covering up, or any other suitable means, are included within the risk of a fire policy. So are damages by falling walls if the walls fall by reason of the fire.

When there is an actual total loss, the insured recovers to the full amount of his insurance if the property be worth so much, and there be no express limitation to a proportion of the loss. In marine insurance there is a constructive total loss whereby, when the property, though not entirely destroyed, is damaged to such an apparent extent as practically to render the voyage worthless as a pecuniary adventure, as where the damage exceeds one half of the value of the vessel or of the goods, or the vessel be captured or detained by embargo, the insured may abandon the damaged or detained property to the underwriter and claim for a total loss, leaving the latter from that time forth to get what he can by sale or use out of the abandoned property. When the loss is partial the rule in marine insurance is that the cost of repairing the vessel, less one third for the greater value of the new substituted for the old, may be recovered; but in fire insurance there is no right of abandonment, and no rule of proportionate deduction on account of the greater value of the new, actual indemnity being the limit of the right to recover. In either case when goods are damaged, the insured recovers the difference between the value of the damaged goods as they are and the market price of sound goods of like kind.

In MUTUAL INSURANCE the holders of policies, besides being insured, are also insurers. They are members of the company, and by virtue of their membership are obliged to contribute to the losses of their associates, and have the right to claim from them by way of assessment or contribution in proportion to the amounts for which they are severally insured, indemnity for their respective losses. Rightly managed, it is a safe and cheap form of insurance, since, whatever be the rate of premium, the associates participate in the profits; and if the premium be fixed sufficiently high the aggregate amount of premiums, paid or promised by deposit notes, will constitute a capital adequate under any but most extraordinary circumstances to meet contingent losses. Mutual fire insurance is better adapted to country practice, where the losses are liable to be sin-

gle and small, than it is to the fluctuations of conflagration losses which are a feature of insurance in cities, and are better met by large capitals and accumulations than by heavy and unexpected assessments on members. What is known as the factory mutual system originated in Rhode Island abt. 1840, and grew out of dissatisfaction with the high rates charged for textile factories and other manufacturing risks which were regarded as excessively hazardous. A mutual insurance company was organized, which was soon followed by others in Rhode Island and Massachusetts. The prime object of these organizations has been not so much the payment of losses as the prevention of losses. To this end buildings accepted must come up to a certain standard, popularly known as "Mill Construction and Sprinkler Equipment." While these companies are important factors in the region where they work and among the classes of risks which they cover, their operations are necessarily very limited as compared with the whole field of fire insurance.

The vast extent of the various forms of fire insurance business in the U. S. is indicated by a few summaries of reports compiled for "The Insurance Year Book." Stock companies, including 36 Lloyds, numbering 347, and mutual companies, excluding about 500 small and purely local concerns, numbering 271, had a combined capital of $88,560,679, and assets $565,677,747; paid for losses in a year $147,089,344; and wrote risks in a year aggregating $32,000,000,000. The property loss by fire, 1908, was estimated at $237,000,000, and the insurance loss thereon at $2,723,945,365.

LIFE INSURANCE.—Life insurance exhibits a larger variety of forms than fire insurance. Here are stock, proprietary, mutual, and mixed companies: level premium, natural premium, and assessment systems of operation; whole-life, term, endowment, joint-life, annuity, tontine, survivorship annuity, renewable term life, industrial, and other forms of policy; and the coöperative plan of organization and operation, followed, with various modifications, by the great fraternal societies.

A *whole-life policy* is a contract in which the company agrees to pay the policyholder or his representatives a specified amount of money at the end of the year in which the person whose life is insured may die. A *term* policy is a contract in which the company agrees to pay the representatives of the insured a specified amount of money at the end of the year in which he may die, provided his death should occur within a certain number of years named in the policy. An *endowment* policy is one in which the company agrees to pay a specified amount to the insured himself at a certain future period (stated in the contract) if he should then be alive to receive it. The net premium may be paid at once or at stated intervals, as may be agreed. Another form is a combination of a pure endowment with a term policy. By it the company agrees to pay a stipulated sum of money at a certain future period in case the person on whose life insurance is made should then be alive, or at his death if that should happen before the expiration of the period. A *joint-life* policy is a contract to pay a certain amount on the death of one of two or more persons named, on the joint continuance of whose lives insurance is made. There are not usually more than two persons named, though there may be three or more.

An *annuity* is a contract in which a company agrees to pay a given sum annually, either during the remainder of life, or for a specified number of years if the person on whose life insurance is made should live so long, in consideration of a gross sum paid at once by the *annuitant*. A *survivorship annuity* is an agreement to pay a specified annuity to a nominee during his survivorship of the person on whose life insurance is made. A *tontine*, or savings fund policy, is an ordinary life or endowment policy with from ten to twenty years or more to run, in which the tontine principle is applied to dividends. The distinctive features of it are: the holders of such policies constitute a class by themselves; they do not participate in profits till after the lapse of a certain number of years (ten, fifteen, or twenty), specified in the policy; in case of death before the dividend period begins, the representatives of the insured receive the sum secured by the policy, and no more; no surrender value is allowed to anyone who may relinquish his policy, and no dividend is credited to such policies as may become claims before the dividend period arrives; all profits accruing from every source within the class are reserved till the arrival of the specified dividend period; the accumulated dividends are then to be equitably divided, on the contribution plan, among such policies as are actually in force.

INDUSTRIAL INSURANCE is provided for people of small means, who make weekly payments of a few cents for insurance not exceeding $500. The small and easy payments and the extension of insurance to persons younger and older than are admissible into the "old line," or level premium, companies, make this form of insurance very popular among the classes it is designed to benefit.

The forms here briefly outlined are the chief and fundamental ones. Other varieties are obtained by variations of conditions as to forfeiture, to mode and time of paying premiums, to distribution of surplus, etc.

According to the World Almanac (1909), the amount of life insurance in force in the U. S., including assessment insurance, was $20,809,015,450; in Great Britain, $4,426,124,000; Germany, $1,400,000,000; France, $727,673,353; Austria, $370,621,530; Scandinavia, $150,402,801; Switzerland, $144,412,854; Russia, $62,839,902. Summaries of compilations in the Statistical Abstract of the U. S., concerning ordinary and industrial companies in the U. S. (1907), show: Number of policies in force, 24,795,137; amount, $14,064,415,202; total income (1907), $678,688,362; total payments to policyholders, $309,699,025; assets, $3,052,775,519; liabilities, $2,736,336,068; surplus, $316,439,451.

Fraternal sick and funeral benefit associations, paying usually from $50 to $100 funeral

benefit and $5 a week in case of sickness, existed and in some measure flourished in the U. S. before the Civil War. Associations on the assessment plan, however, that emphasize the life insurance side only, date in the U. S. from 1866. At about the same time appeared the three kinds of assessment associations, business assessment companies, secret fraternal life insurance societies with branches or lodges, and other secret fraternal life insurance societies sometimes called fraternal orders, that were without lodges or branches, but worked entirely through a central staff of officers, as do the business assessment companies, but, unlike the latter, were confined to some class or occupation or secret fraternity, and did not employ paid agents, at least on any extensive scale, to increase membership. The membership of the principal fraternal organizations in the U. S. and Canada was reported by the World Almanac (1909) at 10,175,976. Large and small, probably more than 100 of these organizations are based on or are allied with the assessment life insurance feature. The report concerning the condition and business of assessment companies and orders shows (1908) a total of 667 companies; assets, $85,544,461; assessments collected, $107,031,073; total income, $128,274,413; payments to policyholders, $88,760,082; total expenditures, $105,851,829; membership, 7,970,839; insurance in force, $8,766,909,295.

Miscellaneous Insurance.—As before stated, almost every person and thing can be protected by insurance in the U. S.; hence an enumeration of all the forms of insurance would be too voluminous for present mention. The World Almanac reported insurance in force (1908): Personal accident and health, $3,800,000,000; steam boiler, $750,000,000; plate glass, $100,000,000; employers' liability (estimate of), $1,800,000,000; fidelity, $1,000,000,000; surety, $1,000,000,000; credit, $40,000,000; burglary, $50,000,000.

Intaglio (In-täl'yō), in art, the opposite of relief; the representation of a head or other object so hollowed out in a gem or other substance that an impression therefrom gives the representation in bas-relief.

In'tegral Cal'culus. See Calculus.

Intem'perance. See Alcohol, Physiological Effects of.

Intent', in law, the voluntary purposing of an act which has legal consequences. A person's intent in a particular transaction is a question of fact. If he has undertaken to express that intent in a document, its ascertainment is for the court, which will apply to the writing established rules of interpretation. If the intent is to be gathered from oral language, and the acts and circumstances attending the transaction, it will generally be determined by the jury. If one has freely accepted in unequivocal words an unambiguous offer made by another, he will not be allowed to get rid of the contract by proof that he misunderstood the offer, and therefore did not purpose to make the contract evidenced by such offer and acceptance. Or if a principal, with knowledge of all the facts, accepts the fruits of an unauthorized contract made on his behalf by an agent, he will not be permitted to show that he did not intend to ratify his agent's acts. In such cases the law regards not the secret thought but the overt act in determining a person's legal intent. In torts, the wrongdoer's intention may or may not be material to the question of his liability, according to the nature of the transaction. Primitive law generally ignores altogether inquiry concerning the intent of the harmdoer. It visits vengeance on the visible cause of the harm, without regard to the innocence or fault of the actor. As a legal system develops it distinguishes accidental from willful harm, but even in its most advanced stage it leaves persons to act in many situations at their peril.

Intercolumnia'tion, clear space between two consecutive columns. In Greek Doric colonnades it commonly measured from one to one and a half times the inferior diameter of the shaft, but in the Ionic order it was never less than two and sometimes reached three diameters in width. In arcaded structures of Roman type the decorative columns or pilasters are widely spaced, with intercolumniations of five or six, or even more, diameters. In nearly all the great monuments of classic architecture, however, the intercolumniations appear to have been determined by considerations of abstract taste rather than by arbitrary rules or traditions.

In'terdict, in European history, censure pronounced by the pope, by a synod, or by a bishop, withdrawing from particular persons or places, or both, certain religious privileges. It still exists in theory as one of the ecclesiastical censures of the Roman Catholic Church, but is seldom exercised, except toward individuals, who may be, for example, interdicted from entering a church. It is also sometimes pronounced against places where horrible crimes have been committed. In the Middle Ages the interdict was the most terrible of punishments. Every man's hand was against the interdicted person, and even great princes have been humbled by the power of this censure. At one time no bell might ring or organ be played in an interdicted district; the church doors were locked; services were performed without solemnities and in secret; all crosses and ornaments were hidden; lenten food only could be eaten; no one could give or receive a kiss; the eucharist was not given except to the dying; no man could shave his beard or brush his hair until the interdict was raised. Few interdicts, however, were so severe as this, though at the best an interdict was regarded as a severe measure. The Church herself from time to time mitigated the terrors of this dreadful visitation. Among the most celebrated interdicts were: that laid on all France by Gregory V, 998; that laid on England by Alexander III, 1171, as a punishment for the murder of à Becket; that laid by the same pontiff on Scotland, 1180; by Innocent III on France, 1200; on England, 1209, under King John; on Venice by Paul V, 1606.

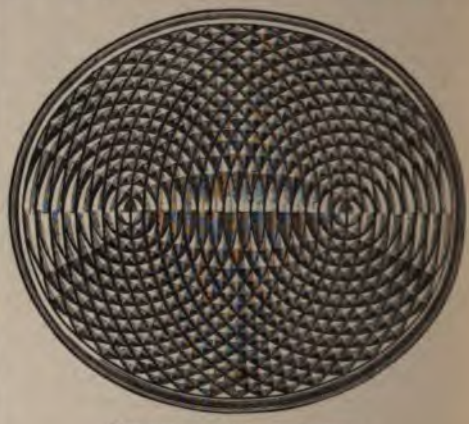
Interdic'tion, in the law of Scotland and in French civil law, a restriction placed on indi-

viduals subjecting them to certain legal incapacities in the management of their property or in the incurring of obligations. In civilized countries generally there are laws of which certain persons who are of unsound mind, or who are unable properly to regulate their financial affairs, such as idiots, spendthrifts, habitual drunkards, etc., are deprived, partially or wholly, of the legal capacity to dispose of or convey away their property or to incur obligations. The procedure by which these laws are enforced is called interdiction in Scotland, and in other countries where the civil law prevails. Many of the states of the U. S. have laws providing for the appointment of a committee or conservator of the property, or of the person and property, of individuals likely to waste their property; but neither in England nor in the U. S. do the laws recognize the right of any person to prevent the extravagance of a relative by judicial proceedings, except where such extravagance is likely to make a person a public burden.

In'terest (psychological and pedagogical). To secure attention is one of the first objects of teachers, and for this the interest of the pupil must be aroused. The natural interest of the child lies in the field of sensation; therefore, in teaching, the first appeal must be made to the senses. By association of ideas an uninteresting subject may be made interesting by establishing its relations to something in which the pupil already has a natural interest. It has been held that it is good for students to be forced to apply themselves to things which are essentially uninteresting, for the sake of the discipline of the mind thus acquired. On the other hand, it is urged that nothing obtains a permanent hold upon the mind and upon life unless it does possess interest. In adult life much drudgery is performed that has no intrinsic interest in itself, but is surcharged with interest on account of its relation to the personal fortunes of the individual. Interest, therefore, seems to be fundamental to attention, and a legitimate and necessary power for the teacher to use.

Interfer'ence, in international law. See INTERVENTION.

Interference, in physics, a phenomenon resulting from the combination of any system of waves with differences of phase. Interference is of great interest in physics; on the one hand, because by means of it, chiefly, such theories as the undulatory theory of light have been developed and the existence of the wave motions by means of which radiant energy is transmitted through space has been established; the other hand, because color effects of the highest degree of beauty have their origin in interference; so that the subject is of æsthetic as well as scientific importance. Interference is met with in every department of physics in which we have to do with wave motion. We have interference of water waves, of the waves of the air, and other media with which acoustics deals, also of the wave systems of the ether (light waves, electro-magnetic waves, etc.). To consider one of the simplest cases, the set of "standing waves" into which an elastic cord is broken up when transverse waves are sent over it, and returned by reflection, are due to interference. The conditions of the experiment are that the successive waves follow one another at intervals, such that the direct and reflected waves meet with permanently fixed difference of



EXAMPLE OF INTERFERENCE.

phase for each point of the cord. The breaking up of such a string into nodes and loops is a familiar phenomenon. Another familiar example is in the standing waves on water or mercury contained in a vessel of symmetrical form. The illustration shows the case of an elliptical dish with waves starting from one focus under the excitation of a series of drops impinging on the surface at that point, and reflected to the other focus.

In'terim, name of certain edicts of Charles V, issued with the object of maintaining the *status quo* until a general council could decide all questions between Catholics and Protestants. There were three such—the Interim of Ratisbon (1541), of Augsburg (May 15, 1548), and of Leipzig (December 22, 1548)—each being the result of conferences between Catholic and Protestant theologians on points at issue. These interims were in reality despotic ordinances of Charles V, attempting to regulate the confessions of faith adopted by the Protestants, and forbidding them to innovate on the doctrines or rites they had once professed or agreed to. The Leipzig Interim was generally disobeyed and resisted by arms, was abrogated by Charles, 1552, and was finally superseded by the Augsburg Confession, originally presented, 1530, confirmed to the Protestant states, 1555, by the Diet of Augsburg.

Inte'rior, Depart'ment of the, one of the executive departments of the government of the U. S. and of several other countries. That of the U. S. was created 1849, and its chief, or secretary, is charged with the supervision of public business relating to patents for inventions; pensions and bounty lands; the public lands and surveys; the Indians; education; railroads; the Geological Survey; the Hot Springs Reservation (Arkansas); Yellowstone National Park (Wyoming), and the Yosemite,

Sequoia, and General Grant parks (California); forest reservations; distribution of appropriations for agricultural and mechanical colleges in the states and territories; the custody and distribution of certain public documents, and supervision of certain hospitals and eleemosynary institutions in the District of Columbia. He also exercises certain powers and duties in relation to the territories of the U. S. The business of the department is conducted by a number of bureaus, each under a commissioner, and by the secretary's assistants.

Interjec'tions, exclamatory words representing the potency or value of unformed sentences. They may express an emotion, a command, a judgment, an indication, an inquiry, or may be merely reflex imitations of sounds. Thus oh! expresses surprise; sh! command to silence; hm! disapproval; hm? inquiry; bang! is imitative. In the strictest sense the term interjection is used of only such words as do not readily admit of classification among the other parts of speech.

Interlak'en, village of Switzerland, 26 m. SE. of Bern; is celebrated for its charming situation near the left bank of the Aar, in the valley of Bödeli, between the lakes of Brienz and Thun, with a view of the Jungfrau, and in the vicinity of some of the most picturesque scenery in Switzerland. It is the starting point from which the Giessbach Fall, the valley of the Lauterbrunnen with the Staubbach, and that of Grindelwald with its glaciers, are usually explored by visitors. The village consists mainly of a line of grand hotels and numerous lodging houses, in front of which runs a magnificent avenue of huge walnut trees. Within a short distance of Interlaken are the old castle of Unspunnen and the ancient village of Unterseen. In the season, from June to October, as many as 25,000 persons have visited Interlaken.

Intermit'tent Fe'ver, or A'gue. See MALARIA.

Inter'nal Rev'enue. See FINANCE.

Interna'tional Associa'tion, The, association of labor unions intended for the defense of the interests of workingmen against the encroachments of the power of capital, and aiming ultimately at the abolition of all labor paid with wages as a form of slave labor, and the establishment of associated labor on a national scale. It was founded September 28, 1864, at a large meeting of workingmen from nearly all European countries in St. Martin's Hall, London, at which the manifesto and statutes, as drawn up by Dr. Karl Marx, were adopted for publication, and a provisory administration established. The statutes of the association were not finally adopted, however, until sanctioned by the first general congress, held at Geneva September 3-7, 1866. Here the programmes of Mazzini and Bakunin were rejected and that of Marx adopted. The next general congress was held at Lausanne, 1867; the third in Brussels, 1868; the fourth in Basel, 1869; but the fifth, planned to take place in Paris, 1870, was prevented from meeting by the Franco-German War. Of these meetings that at Brussels was the most important. It declared that land, mines, and means of transportation should become the property of the state, by which it should be intrusted to associations of workingmen to be exploited for the common good. It protested against all war, and advocated a general strike if war broke out between France and Germany. In different countries, especially in France and Austria, the government interfered, but this only made the association more popular among the workingmen. It received a severe check from the Franco-German War. Many members of the Paris Commune belonged to the association, and the excesses of the Commune were defended by the association. A congress held at The Hague in 1872 was split by irreconcilable differences with regard to the acts of the Commune and other allied questions, as well as the theory of socialism, and the association was dissolved.

International Cop'yright. See COPYRIGHT.

International Date Line. See CHANGE-OF-DAY LINE.

International Exposi'tions. See EXPOSITIONS.

International Law, collection of rules by which nations and their members, respectively, are supposed to be governed in their relations with each other. In its exact sense, law is a rule of property and of conduct prescribed by sovereign power. Strictly speaking, therefore, as nations have no common superior, they cannot be said to be subject to human law; but there is, nevertheless, a body of rules by which nations profess to regulate their own conduct toward each other and the conduct of their citizens, respectively. This body of rules is derived from custom or treaty. No community has ever yet existed, and none could exist, so independent and isolated as to have no communication whatever with its neighbors; and intercourse between communities, as between individuals, necessarily required some kind of regulation.

We find, accordingly, in the oldest historical records mention of messengers or embassies sent by nation or king to another nation or king, and of compacts between them. Treaties followed the unwritten regulations as a matter of course, for the necessity of changing or of adding to existing rules led to express stipulations. These were expressed as stipulations between individuals were expressed: orally before a written language was known, and orally or in writing afterwards. Of these treaties or compacts between nations there are many and multiform records. But notwithstanding the treaties of every kind and form that have been entered into, the greater part of international law is to this day customary only. These customs have been declared and enforced by judicial decisions and set forth in the writings of publicists in all the principal languages of the civilized world.

The laws of states, the ordinances of kings, and the writings of publicists have moderated the severity of earlier times, while every new

treaty between nations has been an addition to public law. Starting from the theory of the natural rights of men and the equality of nations, publicists have striven to establish the code of ethics as the law of nations. Montesquieu declared it as a maxim that nations should do each other as much good in peace and as little harm in war as possible without injury to their own interests. The rules of the Hanseatic League, the laws of Wisby and of Oleron, the Consolato del Mare, and the Ordinances of Louis XIV were all so many contributions to international law. A host of writers have discussed its principles and enforced its precepts. Of these Grotius (*q.v.*) stands as the acknowledged head.

Regarded as a whole, international law consists of two main divisions—one treating of peace and the other of war. The portion of international law relating to peace is naturally subdivided into two divisions—one public and the other private. Public international law contains the rules respecting the relations of nations to each other and to the members of other nations; private international law contains the rules respecting the relations of the members of a nation to the members of other nations. In respect to the first department, they relate to the essential rights of nations, such as their sovereignty, equality, perpetuity, territory, property; to their extraterritorial action in regard to navigation, discovery, exploration, and colonization; to fisheries and piracy; to the intercourse of nations with each other by means of accredited agents; to international compacts, asylum and extradition, national character and jurisdiction, and domicile; and to the reciprocal duties of nations to foreigners, and of foreigners to the nation where they live, in respect of residence, occupation, religion, obedience to the laws, taxation, civil and military service. To the subject of private international law belong provisions respecting private rights and the administration of justice. Here may be grouped together regulations concerning personal capacity, social condition, the validity and interpretation of contracts, the effect of marriages and divorces, the devolution of property at death, the administration of justice, procedure and evidence, as these subjects apply to the persons and property of foreigners. Of all the measures for the civilization of international intercourse and the settlement of international differences, none is comparable to that of international arbitration. The idea is not new—indeed, it is as old as Henry IV of France—but the practice is modern. The U. S. has the honor of having oftenest taught by precept and oftenest adopted in practice the closing of international controversies by the intervention of impartial arbiters.

The subject of international law is so extensive and comprehends so many principles bearing on the rights and duties of nations toward each other that only the briefest allusion to the more important features is here admissible. Any statement must necessarily be incomplete, as new principles are being brought forward constantly, and the determinations of the International Peace Congresses at The Hague, 1899 and 1907, together with the decisions of the International Court of Arbitration, provided for by the first of these congresses, are likely to augment the body of principles now recognized by every nation of importance.

At the outset it is to be noted that states (in the sense of nations) only are the proper and immediate subjects of international law. All sovereign states are equal, so far as essential rights are concerned. It is the clear right of every state to maintain its political integrity in the society of nations, and it may to this end form alliances, provide land and sea forces, build fortifications, or employ any other usual means for defense. Another clear right of every sovereign state is that of exclusive property in its territory, and therefore of inviolability. This right is derived either from conquest or from occupancy, or it may rest on express treaty or conventions with foreign states. The state's exclusive jurisdiction extends over all rivers and lakes which are entirely inclosed within its boundaries. It is difficult to determine rights when a river forms the boundary between or flows through the territory of different states. When it is the limit of conterminous states, the presumption is that both of these have the right of navigation in the whole river.

By the general law of nations the authority of a state reaches over a marine league, or the distance formerly measured by a cannon shot, from the seashore at low tide. The open ocean is the common territory of all nations. Finally, it is an incident of sovereignty that the state may exercise exclusive jurisdiction over all persons within its limits, whether they be its own subjects or those of foreign states, and its laws control all property, real and personal, within the territory, and all acts done and contracts concluded there. The state concedes no proper force to foreign laws, yet upon the principle of reciprocity, or considerations of international comity, they may be recognized and allowed effect. The jurisdiction of a state extends also so far as to exempt its sovereign, or his ambassador, or his fleets and armies, from the operation of the laws of a country where they may be; but, except as it is modified by treaty, the judicial power of every state is coextensive with its territory. Every independent power possesses the right to send and to receive embassies, but privilege of continuous residence rests in comity, and is not a matter of right. Treaties signed by diplomatic agencies are generally not binding on their governments until ratified by the supreme authority. (See TREATIES.) Sovereign states being equal, there can be no supreme tribunal of appeal. Except, therefore, by submission of their wrongs to arbitration, nations have no redress unless by resorting to force. When differences cannot be composed by peaceful means, the injured state may employ measures of retaliation, by reprisals, embargo, or the sequestration of the goods of the offending power, or finally war.

The precise extent of obligation resting on a neutral nation to prevent its territory being made use of in originating hostile measures

against a power with which it is at peace has never been fully determined. In the Treaty of Washington of 1871, between the U. S. and Great Britain, the British Govt. agreed, among other things, that a neutral government is bound: 1, to use due diligence to prevent the fitting out within its jurisdiction of any vessel which it has reasonable ground to believe is intended to carry on war against a power with which it is at peace; 2, not to permit either belligerent to use its ports or waters as the base of naval operations against the other, or for the purpose of the renewal or augmentation of military supplies or arms, or the recruitment of men; 3, to exercise due diligence within its jurisdiction to prevent any violation of the foregoing obligations and duties.

The validity of all claims of prize and capture is determined by the prize courts of the captor's country, but cases of capture on the territory of a neutral, or by vessels fitted out within a neutral's limits, involve an invasion of the neutral's sovereignty, and must be adjudicated in his court. For the international relations of belligerent states, see WAR.

Whether the neutral's exemption can be claimed absolutely for its ships, so as to protect the enemy's goods which they carry, has given rise to one of the most vexed questions in international law. By the declaration signed at Paris, 1856, by the representatives of the chief European powers the principle that neutral ships may carry enemy's goods has finally become established, it may be presumed, in the law of nations. The same declaration sanctions the rule that neutral property, except contraband, is not subject to capture though laden in enemy's ships. Contraband property is subject to confiscation by the captor.

INTERNATIONAL PRIVATE LAW regulates the reciprocal relations of subjects of different states or nations. The notion of such a community of law was foreign to the ancients. To supply its felt need the Roman jurists and their successors fashioned precepts concerning the conflict of laws. To the recognition by all states of a common system three conditions seem necessary: 1, everyone should be assured of the enjoyment of his civil rights abroad as well as at home; 2, everyone should be able to foresee with tolerable certainty what laws will govern the rights attaching to his person, his property, and his acts; 3, the basis of international regulations should be conformable to right, reason, and the nature of things.

The first and most general maxim of international private law results directly from the independence of states, and is: Each state has an exclusive sovereignty and jurisdiction within its own territory. Consequently, the laws of every state govern all persons and all property within its limits. The second general principle is the converse of the former—no state can by its laws bind persons or objects outside its own territory. An important consequence of these two general principles is that all deference paid to foreign laws depends on domestic regulations - on the consent, express or implied, of the state where the foreign laws are applied. International private law rests, then, for its sanction on considerations of utility and reciprocal convenience or comity.

The applicability of a particular law to a given case mainly depends on the nationality or domicile of the person concerned.

Nationality is the quality attaching by birth in, or formal adoption into, a particular community. It has of late lost so much of its significance (by the adoption of the Roman principle that children follow the condition of their parents, and that adults are free to choose their own country) as to be considered by some solely of political moment. The character impressed by birth is so indelible that, on a due change of residence and intention, it easily effaces the supervening character of domicile. It has also the advantage of being directly ascertainable, while domiciles are divided by very indistinct lines.

Domicile is "a residence at a particular place, accompanied by positive or presumptive proof of intention to remain for an unlimited time." Thus it answers to the common meaning of "home." Where a person having two residences makes one his home, that one is to be taken as his domicile. Intent, the element which determines the question of domicile, may be evidenced in various ways. If such intent be proved, the fact of residence for the briefest time will suffice. A person may elect to regard his place of business as his domicile, and he may even have different domiciles for different specific purposes, but he can only have one principal domicile. Minor children, if legitimate, take and follow the domicile of their father until competent to choose one for themselves. Illegitimate children generally follow the domicile of the mother.

An exceedingly important feature of international private law is that relating to the criminal jurisdiction of a nation over citizens of another nation within its own limits. See EXTRADITION.

International Peace Con'gress, conference of representatives of the principal nations of the world for the purpose of initiating methods for the amelioration of the horrors of war; convened at The Hague, 1899, on an invitation to the nations by the Czar of Russia. The chief outcome of the first congress was the provision for the creation of a permanent international court of arbitration, since popularly known as The Hague Tribunal (*q.v.*). To this court Andrew Carnegie gave $1,500,000 for the erection of suitable quarters, a "Temple of Peace," and $500,000 for the purchase of a library relating to the laws of nations. The second congress, 1907, discussed a number of propositions left undecided by the first one and several new ones, suggested by events of the interval.

Internun'cio, representative of the pope sent to small countries, as distinguished from a nuncio, usually accredited to empires, kingdoms, and other large countries.

Interplead'er, in law, the right which a person who holds a fund or has possession of property, or owes a duty or obligation, has,

when there are rival claimants to the fund, etc., and he cannot determine to whom it belongs, to require them to settle in court their conflicting claims as between themselves, and to be allowed on his part to make over the property, etc., to the court, to abide the events of the litigation or to hold it under its direction. The jurisdiction of courts of law over this subject is very limited and imperfect, and this branch of jurisprudence may now, in practice, in the absence of statutes, be said to be exclusively administered in courts of equity. The method in which relief is obtained is by bill in equity.

Interpola'tion, in mathematics, the act of computing omitted terms of a series of quantities, when a sufficient number of their terms is given. For example, if the right ascension and declination of the moon are computed for every twelve hours through the course of a month, it is always possible to determine those quantities for any intermediate hour. The method may be conceived as consisting in a determination of the general law according to which the quantities vary, from a knowledge of the values which they have for every twelfth hour. By the aid of this law the values can be found at any time. The formulas necessary in applying the method will be found in the works on practical astronomy by Chauvenet and by Loomis, and in the introduction to Newcomb's tables of five-place logarithms.

Interpreta'tion, in law, the employment by courts of justice of the familiar logical process of ascertaining what another has intended by the written or spoken words in which he has expressed his meaning. This process is essentially the same whether employed by a judge on the bench in reading a will, a deed, or a contract, or by a private person in reading a letter or a book. It consists merely in the application of reasoning to the words and sentences under consideration. The difference between the two processes in their actual application is that in the forum of private discussion the reader or listener is left perfectly free to apply the methods of comparison, inference, and judgment, as these reside in his own mind, with no restraint save such as may be afforded by the laws of thought; while in courts of justice, where uniformity of interpretation and certainty as to the signification of words and phrases are of the first importance, where the same words must always be taken in the same sense, and where the personal equation of the presiding judge might do infinite harm, these laws of thought have been supplemented, and the application of them controlled by certain rules of law. These rules constitute the law of interpretation. Using the term in its legal sense, then, interpretation signifies the process of ascertaining the meaning of the language employed by a party by the application of sound reason, guided and controlled by certain rules of law.

In'terstate Com'merce, under U. S. laws, commercial intercourse and dealings between persons resident in different states of the Union. Power "to regulate commerce . . . among the several states" is vested in Congress by the Constitution (Art. I, sec. 8, chap. 3). The word "commerce" as here used is interpreted by the Federal courts in its widest sense, so as to include not merely traffic, but commercial intercourse of any kind whatever; and it is held that the power to regulate commerce of necessity includes the power to regulate the means by which it is carried on, so that the scope of the great authority given to Congress by this clause enlarges with the development of the industries of the country and of the means of communication. The effect of this provision is to prohibit legislation in any state discriminating by taxation or otherwise against residents of other states, or against business carried on by them in the state, or imposing directly or indirectly a tax on interstate commerce or passenger traffic even without discrimination (as by the imposition of a license fee, or a tax on receipts); or in any way interfering with it, except by laws passed in the exercise of its police power, to protect life, limb, health, and property of its citizens, or by laws affecting interstate commerce only incidentally, as those regulating highways; or by inspection laws for regulating or restricting the sale of goods injurious to the health or morals of its people, or by those imposing a tax on persons or employments and not in effect regulating interstate commerce; or those imposing taxes on all property in the state.

This regulation of commerce is vested in a commission, appointed by the President under an Act of Congress approved February 4, 1887, which body has authority to inquire into the management of the business of all common carriers who are subject to the provisions of the act. These are all which are "engaged in the transportation of passengers or property wholly by railroad, or partly by railroad and partly by water when both are used, under a common control, management, or arrangement, for a continuous carriage or shipment, from one state or territory of the U. S. or the District of Columbia to any other state or territory of the U. S. or the District of Columbia, or from any place in the U. S. to an adjacent foreign country, or from any place in the U. S. through a foreign country to any other place in the U. S., and also in the transportation in like manner of property shipped from any place in the U. S. to a foreign country and carried from such place to a port of transshipment, or shipped from a foreign country to any place in the U. S. and carried to such place from a port of entry either in the U. S. or an adjacent foreign country."

It has jurisdiction to inquire into and report on the reasonableness of rates on interstate traffic, to decide questions of unjust discrimination and of undue preference, to prescribe the publicity to be given to joint tariffs, and to institute and carry on proceedings for the enforcement of the provisions of the law. It has power to call for reports, to require the attendance of witnesses and the production of books and papers, to hear complaints of a violation of the act made against any such carrier, and to determine what reparation shall be made to a party wronged; to institute in-

quiries on its own motion or at the request of state railroad commissions, and to report thereon; and it is required to make an annual report, which shall be transmitted to Congress. It is also empowered in special cases to authorize any such common carrier to charge less for a longer distance than for a shorter over the same line, and to prescribe the extent to which the carrier may be relieved from the "long and short haul clause" of said act.

The act of February 11, 1903, provides that suits in equity brought under the act to regulate commerce, wherein the U. S. is complainant, may be expedited and given precedence over other suits, and that appeals from the Circuit Court lie only to the Supreme Court. The act of February 19, 1903, commonly called the Elkins Law, makes a carrier corporation liable to conviction for violation of the act to regulate commerce, penalizes the offering, soliciting, or receiving of rebates, allows proceedings in the courts by injunction to restrain departures from published rates, and makes the expediting act of February 11, 1903, include cases prosecuted under the direction of the attorney general in the name of the commission.

Under the act of August 7, 1888, all railroad and telegraph companies to which the U. S. has granted any subsidy in lands or bonds or loan of credit for the construction of either railroad or telegraph lines are required to file annual reports with the commission, and such other reports as the commission may call for. The act also directs every such company to file with the commission copies of all contracts and agreements of every description existing between it and every other person or corporation whatsoever in reference to the ownership, possession, or operation of any telegraph lines over or upon the right of way, and to decide questions relating to the interchange of business between such government-aided telegraph company and any connecting telegraph company. The act provides penalties for failure to perform and carry out within a reasonable time the order or orders of the commission.

The act of March 2, 1893, known as the "Safety Appliance Act," provides that within specified periods railroad cars used in interstate commerce must be equipped with automatic couplers and standard height of drawbars for freight cars, and have grab irons or hand holds in the ends and sides of each car. A further provision is that locomotive engines used in moving interstate traffic shall be fitted with a power driving-wheel brake and appliances for operating the train-brake system, and a sufficient number of cars in the train shall be equipped with power or train brakes. The act directs the commission to lodge with the proper district attorneys information of such violations as may come to its knowledge. The commission is authorized to, from time to time, on full hearing and for good cause, extend the period within which any common carrier shall comply with the provisions of the statute. The act of March 2, 1903, amended this act so as to make its provisions apply to territories and the District of Columbia to all cases when couplers of whatever design are brought together, and to all locomotives, cars, and other equipment of any railroad engaged in interstate traffic, except logging cars and cars used upon street railways, and also to power or train brakes used in railway operation.

The act of June 1, 1898, concerning carriers engaged in interstate commerce and their employees, known as the "Arbitration Act," directs the chairman of the Interstate Commerce Commission and the Commissioner of Labor to use their best efforts, by mediation and conciliation, to settle controversies between railway companies and their employees. Every agreement of arbitration made under the act must be forwarded to the chairman of the Interstate Commerce Commission, who shall file the same in the office of that commission. When the agreement of arbitration is signed by employees individually instead of a labor organization, the act provides, if various specified conditions have been complied with, that the chairman of the commission shall, by notice in writing, fix a time and place for the meeting of the board of arbitrators. If the two arbitrators chosen by the parties fail to select a third within five days after the first meeting, the third arbitrator shall be named by the chairman of the Interstate Commerce Commission and the Commissioner of Labor.

The act of March 3, 1901, "requiring common carriers engaged in interstate commerce to make reports of all accidents to the Interstate Commerce Commission," makes it the duty of such carrier to monthly report, under oath, all collisions and derailments of its trains and accidents to its passengers, and to its employees while on duty in its service, and to state the nature and causes thereof. The act prescribes that a fine shall be imposed against any such carrier failing to make the report so required. See COMMERCE.

In'terval, in music, the distance or difference between any two sounds in respect to depth or height, or of any two notes as measured on the degrees of the diatonic scale, both extremes being counted. Intervals are either *simple* or *compound*, the former being those which are comprised within the limits of an octave, as the second, third, fourth, fifth, sixth, seventh, and eighth; and the latter, those which extend more or less into the region of a second octave, as the ninth, tenth, eleventh, etc. In another sense the term "simple" interval is applied to a *semitone*, because this interval is practically indivisible in the modern system of music, and *whole* tones, as thirds, fourths, etc., are said to be "compound," because they comprise two or more semitones. Of semitones also there are two denominations—*viz.*, the *diatonic* and the *chromatic*, called also *major* and *minor*. When the semitone includes an advance from one degree of the scale to another, it is diatonic; but when the degree on the scale is unaltered, it is chromatic. In the classification of intervals they are regarded as *perfect*, *imperfect*, *diminished*, or *augmented*; to which some add the *double* (or *extreme*) *diminished*.

Interven'tion, in international law, the measures which one state takes to prevent injury to itself arising from the political mean-

ures of another state, or growing for some other reason out of the other sovereign's conduct. Since all states are independent, the presumption is against the right of intervention. Practically one may say that to be justifiable, intervention by one state in the affairs of another must have proved successful. The principal legitimate causes of intervention are, first, that for the purpose of preserving the balance of power—that is, of preventing a state from gaining, by political means or by force, an accession of power which would be dangerous to its neighbors. Many alliances and wars have taken place in Europe on this ground within the last four centuries. The plea here is self-preservation. A second class of instances of intervention, all or nearly all of a modern age, have grown out of the efforts of nations to right themselves against tyrannical governments by revolution. The plea here also is self-preservation—that no government can stand against the revolutionary fever of neighboring countries; but the plea is made for the benefit of the powers that be, and not for that of the people.

It was in pursuance of this principle that Austria intervened in Italy, 1821, to crush the movement of the Liberal party, and France in Spain to assist a Royalist insurrection. Two years later certain European powers took steps toward introducing a similar spirit of intervention in S. America, with the object of restoring the revolting Spanish colonies there to their mother country. It was to meet this proposed step that the Monroe Doctrine was formulated. (See MONROE DOCTRINE.) A *third* and more righteous kind of intervention is that used when a government commits great inhumanity in punishing revolutionists, or great cruelty against rebels in war. Thus, 1827, Great Britain and France intervened to protect Greece from the Turks; 1877, Russia found a reason for its attack on Turkey in the atrocities committed by Turkish soldiers in Bulgaria; and, 1898, the U. S., "in the name of humanity," intervened to put a stop to Spanish atrocities in Cuba.

Intes'tacy, the state of dying without having made a valid will. See ADMINISTRATION; EXECUTOR.

Intes'tine, that portion of the digestive and excretory apparatus below the stomach, divided into the small and large intestines. The former includes the duodenum, jejunum, and ileum; the latter, the cæcum, colon, and rectum. Next below the stomach comes the duodenum, about 12 in. long, receiving the ducts from the liver and pancreas. The jejunum and ileum, which follow, have no distinct line of separation, and form a canal four or five times as long as the body, and of less caliber than the duodenum or the intestines below. The jejunum is named from its always being found empty. Of the large intestine the only portion to be alluded to is the rectum, the terminal portion of which lies in the concavity of the sacrum, the lower extremity being furnished with sphincter muscles. Its use is principally as a reservoir for fecal excrement. The contents of the intestinal canal are propelled by the peristaltic movements of circular and longitudinal muscles in the muscular coat,

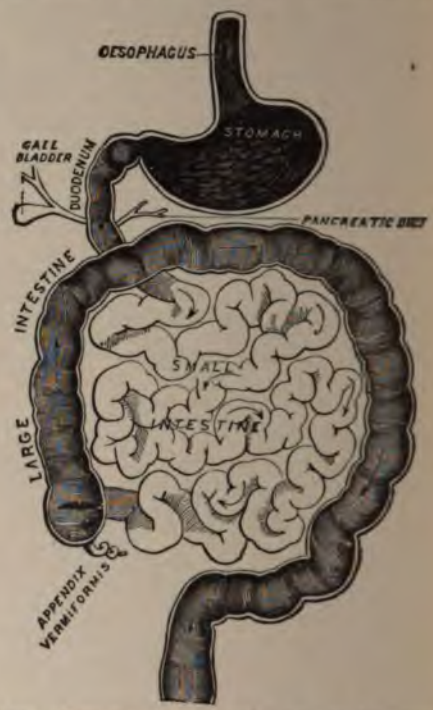


DIAGRAM SHOWING ARRANGEMENT OF THE INTESTINES.

which lies immediately beneath the serous or peritoneal investment.

Intona'tion, musical term denoting, in a general sense, the utterance or delivery of any series of sounds formed on the scale. This, when correct in time, accurate in pitch, and refined in taste and expression, is said to be *pure*. The contrary, but more especially a failure in correctness of pitch, is called *false* intonation. In church music the name of "intonation" is given to the two or more notes leading up to the dominant or reciting note of a chant or melody, usually rendered by the priest or precentor, or else by one or more leading voices.

Intoxica'tion. See ALCOHOL, PHYSIOLOGICAL EFFECTS OF.

Intoxication, in law, the legal view of the effect of one's intoxication as it attaches to his contract, tort, or crime. Concerning contracts, a party may relieve himself from a contract by showing that he entered into it while intoxicated, provided that such intoxication was brought about by the other party, or that an undue advantage was taken of his condition. While drunkenness is not a general defense in actions on torts, it may be available where the wrong is of a particular sort, requiring a special intent. It has also been held that drunkenness may be treated by the jury as aggravating an assault and battery.

Voluntary drunkenness is no excuse for the commission of a crime. Voluntary drunkenness, being itself a wrong, satisfies the requirement of a general criminal intent; but if a specific intent is an essential ingredient of a particular crime—as the intent to commit a felony in the case of burglary—the intoxication of the criminal may be shown to disprove such intent. The conduct of one who commits a crime without provocation, although in a frenzy of drunkenness, is subject to the same construction and to the same legal inferences on the question of intent, even as affecting the grade of his crime, as are applicable to a person entirely sober. If a legal provocation has been given, intoxication may be considered in determining whether the criminal act was induced by such provocation or resulted from the malice of the prisoner. Where drunkenness, though voluntary, has resulted in *delirium tremens*, its victim is deemed insane, and his responsibility is determined by the rules applicable to insanity. Intoxication produced without one's consent or fault exonerates him from criminal responsibility for acts which it induces.

Intro'it, in the Roman Catholic liturgy, an antiphon, with a verse generally taken from the Psalms, sung by the choir at the beginning of mass, and recited by the priest when he has ascended the altar.

Introspec'tion, act of examining one's own consciousness to obtain knowledge of oneself. The "method of introspection" is opposed to the "objective method" in psychology, the latter proceeding by experiment, observation of others, inference, etc. Psychology differs from all other sciences in that it has to appeal to introspection or self-examination for the final testing of its truth about the mind.

Intui'tionalism, theory, in its broader sense, that fundamental principles of being are known directly without the intervention of either sense experience or discursive logical processes; in its narrower sense, the theory that moral distinctions are known in this direct fashion. The common use of the word in philosophical discussion seems to date mainly from Price, but the idea is at least as old as Aristotle. Complication arises in defining the word from the fact that most modern intuitionalists have modified the theory, and use the term to denote the existence of *a priori* principles native to the structure of the mind and regulative of its operations, but not necessarily brought before consciousness save through experience and reflection. In this sense "intuitionalism" is often used to designate any theory which holds that there are universal and necessary principles either of knowledge or of being, the mode in which these principles come to consciousness being unknown.

Inunda'tion. See FLOOD.

Inverness', capital of Inverness-shire, Scotland; near the mouth of the Ness, which flows into the Moray Firth, and at the N. end of the Caledonian Canal; 108 m. WNW. of Aberdeen, and 190 m. NNW. of Edinburgh; has considerable manufactures of linen and hemp stuffs and extensive shipbuilding docks. With Aberdeen, Leith, and London, on the E. coast, and by means of the Caledonian Canal with Liverpool and Glasgow, on the W. coast, it carries on a considerable trade, exporting sheep, wool, and agricultural produce, and importing coal and provisions. On a hill to the SW. of the town stood the castle in which Macbeth murdered Duncan; on Craig Phadraig hill, about a mile W. of the town, stands a ruined fort, which was the residence of the Pictish kings. Pop. (1901) 21,193.

Inver'sion, in music, a term of frequent use to denote certain changes in melodies, chords, or harmonies, by which (1) the motion of an air is reversed, or (2) an interchange is made between the upper and lower terms of single chords, or of voices in a composition consisting of two or more parts. A *melody* is said to be inverted when its *motion* upward or downward is reversed, as if it were turned upside down. This is also called *reversion*. A *chord* is inverted when the lower note is *not* the root or fundamental bass, but is the original third, fifth, or seventh, etc.; just as, in an arrangement of the figures 1, 3, 5, we might "invert" them thus: 3, 1, 5, or 5, 3, 1. A *harmonized theme* or subject is inverted when any two or more of its parts change places, the higher becoming the lower, and the lower the higher.

Invertebra'ta, term introduced by Lamarck to include all animals which lack a vertebral column. The group has long been recognized as not possessing a natural character, but as containing a most diverse assemblage of forms, but the name has been retained as a matter of convenience, and we still have "anatomies of the invertebrata" and the like. The groups which are included under this heading are the *Protozoa*, *Cœlenterata*, *Sponges*, *Worms*, *Echinodermata*, *Mollusca*, and *Arthropoda*.

Inves'titure, public delivery of a feud or fief by a lord to his vassal, performed by the presentation to the person invested of some symbol of authority and possession. Thus, when lands were transferred, the grantor gave the grantee a turf as bearing resemblance to the property transferred. In ecclesiastical history, by the right of investiture was meant that claimed by the temporal lord of presenting a prelate with the ring and crosier, the acknowledged emblems of episcopal and abbatial jurisdiction. This claim was long resisted by popes and councils, and gave rise to much controversy. In France and England it ended in a compromise whereby the sovereign relinquished the presentation of the symbols, but retained the right of investiture by a written instrument.

In'volute, curve generated by any point in a string when the latter is unwound under tension from a given curve. This mode of generation implies that the given curve is represented by a pattern cut out of some rigid material, as wood or metal. Thus, to draw an involute of a circle, we cut out a circular pattern, around which we wrap a string; we then lay the pattern on a plane surface, attach a

pencil or tracing point at some point of the string, and unwrap the string; the pencil or point will trace out the required involute.

I'o, in Greek mythology, the daughter of Inachus, or, according to some, of Piren or Jasus. She was beloved by Jupiter, who on account of Juno's jealousy changed her into a heifer. Juno placed her under the charge of Argus Panoptes. Mercury, commissioned by Jupiter, slew Argus and delivered Io. Thereupon Juno sent a gadfly, which tormented Io and pursued her over the earth, till at last she rested on the banks of the Nile, where she recovered the human form, bore a son to Jupiter named Epaphus, and, according to some accounts, introduced the worship of Isis, with whom she afterwards became identified.

I'odine, element discovered by Courtois, of Paris, 1812, in the mother liquor from the kelp or ash of seaweed which had been burned in order to obtain sodium carbonate. Its atomic weight is 127; its symbol is I. It is found in many mineral waters, in sea water, in seaweeds, in sponges, oysters, and other forms of marine life. Cod-liver oil contains from 0.03 to 0.04 per cent of iodine. It is found also in many land plants, as tobacco and water cresses, and even in potatoes, beans, barley, and oats. Certain minerals also contain it, though those containing it as an essential constituent are comparatively rare. Such are iodyrite, or silver iodide, found among silver deposits in Mexico, Chile, and Spain, and coccinite, or mercury iodide, found in Mexico. Iodine also occurs as an accidental constituent in some dolomites, where it is combined with calcium and magnesium; in several deposits of alkaline salts, as Chile saltpeter and rock salt. In some cases it has been found in the products from gas works.

Iodine is used in medicine in simple solution in alcohol, or dissolved in water by the aid of potassium iodide. Internally, in single dose, the effects vary according to the quantity swallowed—from mere uneasiness in the stomach to severe gastric pain, with vomiting and purging, headache, giddiness, and, rarely, even general prostration and death. Preparations of iodine are used locally as counter-irritants, and internally they influence nutrition, proving useful in goiter, certain forms of scrofulous disease, affections of the fibrous and muscular tissues, etc. For internal administration, however, the alkaline iodides, especially potassium iodide, are now far more frequently used than solutions of iodine. The compounds of iodine are largely used in photography.

Iod'oform, a methenyl ether, CHI_3, formed by the mixing of alcoholic solutions of potassa and iodine. It is in the form of small, glittering, scaly, yellow crystals of a sweet taste, and strong, peculiar, very persistent, saffronlike odor. Iodoform is a valuable medicine, being a local antiseptic and anæsthetic. It is unirritating, even to mucous membranes or abraded surfaces.

Iola'us, in Greek mythology, the charioteer and companion of Hercules, to whom he was the first to pay divine honors after his death. He was said to have been the first victor at the Olympian chariot races, and to have conquered and civilized the island of Sardinia, where he died and was worshiped as a hero.

Iol'cus, in mythical times a city in Thessaly; on an eminence at the base of Mt. Pelion and at the head of the Gulf of Pagasæ, now probably Episcopi; was distinguished in antiquity as the birthplace of Jason (*q.v.*), and the port from which the Argonautic expedition sailed in search of the Golden Fleece.

I'olite, mineral, essentially a silicate of alumina, magnesia, and protoxide of iron; its hardness is from 7.0 to 7.5; specific gravity 2.6; in color it occurs of various shades of blue, and exhibits in a marked manner the property of dichroism, or of presenting, when viewed in different directions, different colors.

I'on, in Greek mythology, a son of Apollo and Creusa, the daughter of King Erechtheus of Athens; brought by Mercury to his father's temple at Delphi, where he was educated. When Creusa married Xuthos, but bore him no children, a false oracle made Xuthos believe that Ion was his son, and he took the youth into his house. Creusa, not recognizing him, tried to poison him, and fled to Delphi, where a priestess told her that Ion was her own son. This myth has been treated by Euripides in his tragedy "Ion."

Ion, native of the island of Chios (484–421 B.C.) who was ranked by ancient scholars as one of the five poets of the canon; was contemporary with Æschylus, Sophocles, and Pericles; was an intimate friend of Cimon; and on one occasion carried off both the dithyrambic and the tragic prizes. In his joy over the victory the poet, who was a wealthy man, is said to have sent every Athenian a jar of Chian wine. A graceful and airy genius, Ion exhibited a rare versatility such as we encounter nowhere else in classic Greek literature.

Io'na, or Icolmkill (ī-kōm-kīl'), called also I or Hy, small island of the inner Hebrides, Argyleshire, Scotland, separated from Mull by a channel 1¼ m. wide, called the Sound of I or of Icolmkill; is 3 m. long by 1½ m. broad; has an irregular surface of moorland, rising in places to 400 ft. The island was given by the Pictish king Bridius, 563, to St. Columba, who founded there a celebrated monastery, and a college which flourished till the Reformation. Previous to his time it was the chief seat of the rites of druidism. It is now the property of the Duke of Argyll. Iona is said to have had at one time 360 stone crosses, resembling those of Ireland, but only four now remain. Sepulchral remains cover the island, both in the shape of cairns and of stone monuments of all kinds, Iona having been considered from time immemorial a sacred island. Many Scotch, Irish, Norwegian, and even French kings were buried here, the last of whom is said to have been Macbeth.

Io'nia, ancient name of a portion of the W. seacoast of Asia Minor, on the Ægean Sea. It derived its name from its inhabitants, the supposed descendants of the mythic hero, Ion, son of Apollo. Ionia extended from the river Hermus to the Mæander, and was the seat of the Ionian League of twelve cities, chief of which were Ephesus, Smyrna, Clazomenæ, Erythræ, Colophon, and Miletus. Smyrna, however, which subsequently obtained so prominent a position in the league, was originally an Oolic colony, but was captured by an Ionian band and incorporated with the Ionian union. Miletus, which was at one period the most flourishing city belonging to the league, existed long before it, and was originally founded, it was said, by Carian colonists. According to tradition, Ionia was colonized abt. 1050 B.C. by settlers from Attica; but Dr. E. Curtius, in his "History of Greece," has shown reasons for believing that the Ionians had resided there from time immemorial. Ionia produced many men distinguished in poetry, philosophy, and history; she gave the world a Homer, not to mention Anacreon, Anaxagoras, Thales, and many other philosophers, as well as the painters Apelles and Parrhasius.

Io'nian Is'lands, chain of islands extending along the W. and S. coast of Greece, of which the largest are Corfu, Paxo, Santa Maura, Theaki, Cephalonia, Zante, and Cerigo; area, 1,041 sq. m. From the beginning of the fifteenth century to 1797 they belonged to Venetia. From 1797 to 1815 they changed masters five times, but were then formed into a republic under English protection. In 1864 they were ceded to Greece by the British Govt., the inhabitants being Greeks. The islands are fertile and well adapted to the cultivation of vines and olive trees. Currants and olive oil are their main exports. Pop. about 250,000.

Ionians, race of Greek descent who resided chiefly in Asia Minor and the adjacent islands, but spread themselves to all parts of the E. Mediterranean, to the Delta of the Nile, and to India as far as Orissa. According to the prevailing legend, their ancestor was Ion, the son of Apollo and Creusa, who may perhaps be identified with the Javan of the Mosaic table of the founders of nations. The Greek legends speak of the Ionians as migrating from Attica about the eleventh century B.C., and settling in Asia Minor, incorporating with themselves some of the original inhabitants and driving out the others. The Ionians were ever a maritime race, and some writers urge with much plausibility that they went to Attica from the East, and that their migration to the shores of Asia Minor was a remigration to their original abode; and indeed the Egyptian monuments of the fifteenth century B.C. contain the same group of hieroglyphics by which the Greeks were designated in the time of the Ptolemies.

Ionian Sea, name of that part of the Mediterranean between Italy and Sicily to the W., and European Turkey and Greece to the E.; forms the gulfs of Taranto and Patras, and communicates with the Adriatic by the Strait of Otranto.

Ion'ic Or'der, one of the three orders of architecture common to ancient Greek and Roman architecture; is characterized by a capital having volutes, as though an abacus of great length had been curled up in a scroll on either side the shaft. Under this, inclosed between the volutes, is a carved echinus, capping a deeply fluted shaft having flat arrises between the flutings, the shaft standing on a richly molded base. The entablature has an architrave in three bands, a broad frieze, plain or adorned with carving, and a cornice which in some examples is decorated with dentils under the corona.

I'ons, components into which an electrolyte is broken up on electrolysis. The one, the anion (the electro-negative component, *e.g.*, chlorine), travels "against the current" (in its conventional direction in the circuit), and is deposited on or chemically attacks the anode or positive electrode; the other, the cation (the electro-positive component, *e.g.*, copper), travels "with" the current to the cathode.

I'os, island of the Ægean, now, but not anciently, reckoned as one of the Cyclades; modern name Nio; lies N. of Theara and SW. of Naxos, and is 11 m. long and 5 broad; area, 20 sq. m.; Homer was said to have been buried on the island, and his grave was shown throughout antiquity. His mother, Clymene, was born on the island, which claimed to be the birthplace of Homer also.

I'owa, river in the state of the same name; it rises in Hancock Co., near the Minnesota line, flows SE. for 300 m., passing Iowa City, and enters the Mississippi 35 m. N. of Burlington; navigable for small steamers to Iowa City, 80 m. from the mouth.

Iowa, popular name, HAWKEYE STATE; state flower, wild rose; state in the N. central division of the American union; bounded N. by Minnesota, E. by the Mississippi River, which separates it from Wisconsin and Illinois; S. by Missouri, except for a short distance where the Des Moines River forms the boundary; W. by the Missouri and Big Sioux rivers, which separate it from Nebraska and S. Dakota; greatest length from E. to W., 306 m.; greatest breadth from N. to S., 204 m.; area, 56,025 sq. m.; pop. (1905) 2,210,050. The elevation of the state above sea level varies from 444 ft. at the SE. corner to 1,694 at the highest point on the summit divide near Spirit Lake, Dickinson Co. Iowa is a prairie state, a gently undulating, gradually sloping plain, without large forests, or swamps, or barren wastes. Considerably more than half the state is drained by the Mississippi River, into which flow all the longest and largest streams. The more important of those belonging to the Mississippi system are the Upper Iowa, Turkey, Maquoketa, Wapsipinicon, Cedar, Iowa, Skunk, Des Moines, Raccoon, and Boone. In the Missouri system are the Floyd, Rock, Little Sioux, Maple, Boyer, Nishnabotna, Nodaway, Platte,

Grand, and Chariton. The Big Sioux is a large stream forming part of the state's boundary. Principal mineral products, bituminous coal, cannel coal (in small deposits), lead and zinc ores, iron ore in small quantities, granite, limestone, sandstone, brick and potters' clays, gypsum, lime, and building stone; value mineral products (1907) $17,623,094, including coal, amounting to $12,258,012.

About ninety-five per cent of the surface of the state is tillable land. The soft, black loam of the prairies is a drift soil, from 1 to 3 ft. deep. The loess, found along the Mississippi and Missouri rivers, is a fine, claylike soil, also a glacial deposit. The alluvial soil of the river bottoms is rich, productive. and durable.

The principal crops, 1908, were: corn, 287,456,000 bu.; wheat, 8,068,000; potatoes, 11,280,000, and hay, 6,460,000 tons; flaxseed, 360,000 bu. The live stock (1908) comprised 1,419,000 horses, 1,555,000 milch cows, 3,881,000 other cattle, 718,000 sheep, and 8,413,000 swine. The wool clip, 1908, yielded 1,625,000 lbs., valued at $894,000. Dairy farming and poultry keeping are important. The climate is frequently, though not invariably, marked by severe winters and summers with brief periods of intense heat; temperature ranges about 120° from the minimum of winter to the maximum of summer, but the extremes are of short duration; annual mean temperature about 47°. Though Iowa is preëminently an agricultural state, manufacturing has steadily increased. The state produces in great abundance raw materials; the streams furnish abundant water power, and about one third of the counties supply coal. Among articles of manufacture and industries are slaughtering and meat packing, butter and cheese, flour and feed, lumber, cars, carriages, furniture, foundry and machine work, bricks, pottery, leather, saddlery, woolens, pig lead, lime, metallic wares, tobacco and liquors; number of factory-system manufacturing plants (1905) 4,785; capital, $111,427,429; value of products, $160,572,313. The mining of coal, lead, zinc, and gypsum is an important industry, as is the quarrying of sandstone, etc. Within the state (1908) there were 983,952 m. of railway and 273 m. of interurban railway, besides 600 m. of electric-railway

Educational institutions include a State College of Agriculture and Mechanic Arts and twenty-five universities and colleges, the more important being the Univ. of Iowa, Iowa City; Drake Univ., Des Moines; and the Highland Park College (industrial), Des Moines. Charitable institutions include besides almshouses and asylums for the insane, 41 hospitals (7 public, the rest private or ecclesiastical), 12 orphanages, 24 homes, 2 schools for the deaf and dumb (one public). Marquette and Joliet visited Iowa 1673, as they followed the course of the Mississippi to its mouth. Julien Dubuque, with ten others, went there, 1788, to work the lead mines at Dubuque, but the settlement was abandoned at his death. France laid claim, 1673, to all the lands drained by the Mississippi, on the ground of Marquette's explorations. The French claim was transferred to Spain by treaty, 1763, but was again ceded to France, 1800–1, as the "Louisiana Purchase," became, 1803, the property of the U. S. The Indian claims to Iowa Territory were purchased by the U. S. in several successive treaties, 1832–43. Iowa became a territory, 1838, and a state, 1846. The state capital was first located at Iowa City, but was removed, 1857, to Des Moines.

Iowas, members of a tribe of N. American Indians, belonging to the Siouan stock, and once forming part of the Winnebago nation with the Otos, Missouris, Omahas, and Poncas. The first stopping place of the Iowas after parting from the Winnebagos was on the Rock River, Ill., near its junction with the Mississippi. They wandered over the region between the mouth of the Minnesota River and the Missouri opposite Fort Leavenworth. In 1804 they occupied a single village on the Platte River; 1824, ceded all their lands in Missouri; 1836, were removed to Kansas; 1890, a part settled in Oklahoma; and, 1905, numbered 225 in Kansas and 89 in Oklahoma.

Iowa, Univer'sity of, coeducational, nonsectarian institution in Iowa City; opened, 1855; reorganized, 1860; has departments, collegiate (established, 1855), law (1868), medical (1870), homœopathic medical (1877), dental (1882), and pharmaceutical (1886); has productive funds, $235,120; grounds and buildings valued at $1,250,000; volumes in library, 75,000; teaching staff (1908) about 160; and students in all departments, 2,315.

Ip'ecac, important drug, the dried root of *Cephælis ipecacuanha*, a small, shrubby, perennial plant, natural order *Rubiaceæ*, growing in Brazil. The plant yields a fawn-colored powder of peculiar smell and acrid, bitter taste. Its active principle is an alkaloid, *emetine*, which, when pure, is a white uncrystallizable powder, difficultly soluble in water, but soluble in alcohol. Ipecac is used in small dose as a stomachic tonic, in somewhat larger as a relaxer of the dry and stiffened condition of the respiratory mucous membrane in the first stage of a catarrh, and in still larger doses as an emetic. With certain precautions the emetic effect even of a large dose may be avoided,

and thus given ipecac is a valuable remedy in dysentery. Powdered ipecac and opium, 1 part

IPECAC PLANT.

each, and sugar of milk 8 parts, form compound ipecac powder or Dover's powder.

Iphicrates (I-fĭk'rā-tēz), 419–350 B.C.; Athenian general, who distinguished himself greatly in the Corinthian war (395–387 B.C.) by organizing a force of light troops with which he routed the Lacedæmonian army near Corinth, 392 B.C. After the peace of Antalcidas he went to Thrace, where he fought in the service of Cotys, whose daughter he married, and where he founded the city of Drys. In 377 he commanded the Greek auxiliaries who followed Pharnabazus, the Persian satrap, on his campaign against Egypt. A disagreement arose between the Greek and the Persian commanders, and Iphicrates fled to Athens, where Pharnabazus tried to arraign him for treachery, but failed. In the social war Iphicrates once more commanded the Athenians, but though successful, was again accused and acquitted.

Iphigenia (If-I-jē-nī'ā), daughter of Agamemnon and Clytemnestra. When the Grecian armament was assembled in the port of Aulis to sail against Troy, the winds proving unpropitious, Calchas the seer declared that the sacrifice of the daughter of Agamemnon was indispensable to propitiate the gods. When Iphigenia was about to be immolated, Diana bore her in a cloud to Tauris, where she became her priestess. Her brother Orestes having found her there, she returned with him to Argos, and was afterwards priestess of Diana at Sparta.

Ipomœa (Ip-ō-mē'ā). See JALAP.

Ipsambul (Ip-sām'bōl). See ABU SAMBUL.

Ipsa'ra. See PSARA.

Ip'sus, small town of Phrygia, Asia Minor; celebrated for the great battle fought there (301 B.C.) between King Antigonus and his son, Demetrius Poliorcetes, and the combined forces of Cassander, Lysimachus, Ptolemy, and Seleucus, in which Antigonus was slain and his dominions conquered. In the seventh and eighth centuries A.D. Ipsus was the seat of a Christian bishopric. Its exact site has not yet been found, though it was probably at the foot of Sultan Dagh, in the neighborhood of Tchai or Isaklü, midway between Afium and Ak Shehir.

Ips'wich, county town of Suffolk, England; on the Orwell; 69 m. NE. of London; has many educational institutions, among which are a grammar school founded by Cardinal Wolsey, who was born here, a Mechanics' Institute and a Workingmen's College, large iron and soap factories, manufactures of agricultural implements and clothing, and extensive ship-building docks. Ipswich was pillaged by the Danes, 991 and 1000. Pop. (1908) 73,852.

Iquique (ē-kē'kā), capital of province of Tarapaca, Chile; on the Pacific Ocean; 40 m. N. of Tarapaca City; suffered severely by earthquakes, 1868 and 1877; was blockaded by the Chileans soon after they declared war on Peru, 1879; bombarded and captured in same year; was ceded to them by treaty, 1884; has become one of the most prosperous places in N. Chile. Pop. (1907) 44,500.

Iquitos (ē-kē'tōs), river port of Peru; department of Loreto; on the Upper Amazon River; has acquired large commercial importance since the introduction of steam navigation on this part of the river; contains iron works, shipyards, large floating dock, sawmills, machine shops, and other industrial plants; and is the seat of an extensive trade in rubber. Pop. of district (1908) 12,000.

Irak-Ajemi (ē-rāk'-ăj'ē-mē), central province of Persia, comprising a portion of the great desert, and corresponding to the ancient Media; principal rivers, Kizil Uzen and Kerab; principal towns, Ispahan, Teheran, and Kum.

Irak-Arabi (-ă'rā-bē), common designation among Orientalists for the SE. portion of Asiatic Turkey and some adjoining territory to the E.; is an immense tract of territory, bounded E. by Persia, and stretching on both sides the Tigris and Lower Euphrates S. to the Persian Gulf. In it are found the sites of Babylon, Seleucia, and Ctesiphon, and it includes ancient Chaldæa. Since its conquest by Khaled (633) nomadic Arabs have formed the majority of its population; chief towns, Bagdad and Bosra (capital).

Iran (ē-rān'). See PERSIA.

Iranians (I-rā'nī-ănz), or **Era'nians,** natives of Iran or Persia in its broadest sense. The term Iran is the native name of Persia, and is still so employed as the official designation of the kingdom.

As a geographical designation Iran applied anciently to the country between the Indus and the Tigris, extending from the Persian Gulf on the SW. to the Caspian Sea and the Oxus on the N., as well as to the Pamir plateau on the NE. Much of this land is well watered and fertile, but there are also extensive mountainous regions as well as large tracts of barren wastes.

Under the term Iranians to-day are included the Persians, Kurds, Ossetians, Afghans, Baluchis, and some other peoples of the Pamir table-land. Their distribution ethnographically over the country is fairly uniform, although the proximity of Iranic territory to Turanian, Indic, and Semitic lands has not been without effect on blood as well as on language. There are evidences, for example, of some foreign tribes and of borrowed linguistic elements, even in the midst of Iran, and the infusion of Georgian and Caucasian blood may be recognized among the modern Persians. Representatives of Iranic peoples, on the other hand, have pressed westward beyond their own borders, for we have evidence of their penetrating into Armenia and Asia Minor, or, again, eastward into India. The best illustration and proof of this is the existence of the Parsi community in Bombay; the Parsis are Zoroastrian refugees from Persia. Furthermore, regarding the commercial occupation and economic life of the modern Iranians, most of the people are agriculturists, cattle raisers, tradesmen, or artisans. The nomadic portion of the population is chiefly of Turanian blood.

Irapuato (ē-rä-pwä'tō), city in the State of Guanajuato, Mexico; 33 m. S. of Guanajuato city; at an elevation of about 6,000 ft.; was founded 1547, and is a good example of the older Mexican cities, having several large convents, churches, etc., dating from the sixteenth and seventeenth centuries. It was a place of some importance during the early revolutionary struggles, and is now the center of an important agricultural district. Pop. abt. 20,000.

Irawadi (ē-rä-wä'dĭ), river of Burma, India; rises probably in Upper Burma, between Assam and Yunnan; flows, after a course of about 900 m., into the Bay of Bengal. In lat. 17° N. it separates, and between its extreme E. branch, the Rangoon, and its extreme W. branch, the Bassein, it forms a delta intersected in all directions by its minor branches, comprising an area of 10,000 sq. m. and covered with teak forests and inextricable jungles. The river is navigable for vessels of 200 tons burden as far as Ava, 400 m. from the sea, even at low tide, and canoes ascend safely 180 m. farther up the river. It is completely under British control.

Ire'land (in Irish, ERIN), mentioned by Pliny and other ancient writers under the names of Hibernia, Ibernia, Ivernia, and Ierne; called Erin by the Celts; second largest of the British Isles; is washed on three sides by the Atlantic, and separated from Great Britain by the Irish Channel or Sea; greatest length 303 m.; greatest breadth 177; area, 32,605 sq. m., exclusive of that of 196 smaller islands belonging to it, whose area is 246 sq. m.; pop. (1901) 4,458,775; is divided into the four provinces, Leinster, Munster, Ulster, and Connaught, and thirty-two counties; capital, Dublin. By far the greater portion of the land consists of a level or undulating plain, filling up nearly the whole center from sea to sea, and consisting to a great extent of bogs, which are incapable of cultivation and impart a dreary aspect to the country. The most elevated mountains are in SW. Ireland, where the Carn Tual rises to a height of 3,422 ft. The Wicklow Mountains near the E. coast culminate in the Lugnaquilla (3,047 ft.). The rivers flow for the greater part through plains, enlarging sometimes into lakes, and are navigable in several instances almost to their sources. The Shannon is the most important. It forms several lakes, among which Loughs Allen, Ree, and Derg are the most noteworthy, and is navigable as far as the former, a small portion above Limerick excepted, where navigation is obstructed by the rapids of Doonass. The Lee is only a small river, but its mouth forms the important harbor of Cork. The Barrow enters the sea at Waterford, and is navigable as far as Athy, whence there is a canal to Dublin. The Liffey is remarkable solely because it enters Dublin Bay. The Boyne is the most important river on the E. coast, but navigable only for 20 m. above its mouth. The Erne forms several important lakes, and is navigable almost throughout its entire length. The Corrib forms the discharge of Lough Corrib, and enters the sea at Galway, on the W. coast of Ireland. A subterranean river, 5 m. in length, connects Lough Corrib with Lough Mask. The country abounds in lakes, the largest of which is Lough Neagh (158 sq. m.), in the NE. part of the country. The Lakes of Killarney are famed for their beauty. The mean temperature in winter is 41.5°, in spring 47°, in summer 60°, and in autumn 51° F.

The climate is more favorable to cattle-breeding than to the cultivation of cereals. The principal crops are oats, potatoes, turnips, barley, wheat, and flax. The fisheries were far more important formerly than now. The decrease is due to emigration and the great demand for seamen. The rivers swarm with salmon, and the surrounding coasts with cod, ling, hake, herrings, pilchards, etc., yet the markets are being supplied with cured fish from Scotland and the Isle of Man. The mining industry is of very subordinate importance. In 1905 only 90,335 tons of coal were produced. The insignificant development of the coal industry is to be regretted, as immense stores of iron of good quality and easily accessible are at hand, but remain unutilized on account of lack of fuel. Peat is plentiful and much used. Gold and copper also occur. Ireland is not a manufacturing country, its only productions of importance being linen and woolen fabrics. The principal seaports are Dublin, Cork, Belfast, Waterford, and Limerick; the principal exports, cattle, sheep, horses, butter, bacon, and other agricultural produce, porter, whisky, and linen and woolen goods.

According to the census of 1901 there were in Ireland 3,308,661 Roman Catholics, 581,000 Protestant Episcopalians (Church of Ireland), 453,173 Presbyterians, 62,006 Methodists, 25,298 Independents, Unitarians, and Baptists. The Roman Catholic Church is governed by four archbishops and twenty-three bishops, besides a bishop auxiliary. See IRELAND, CHURCH OF.

A system of national education was inaugurated 1845, but as these national schools are not denominational, they have never been sup-

ported heartily by the ministers of different religious bodies. In 1905 there were 8,651 of these elementary schools with 737,752 pupils. Among the superior schools, Trinity College at Dublin, the Queens Colleges at Cork, Galway, and Belfast, and the Royal College of Science, Dublin, are the most important. These institutions are open to all alike, without reference to religious creed. There is likewise a Roman Catholic Univ. Maynooth College is the principal institution for the training of priests.

Ireland has formed part of the United Kingdom since 1799, and is represented in Parliament by 28 peers and 103 representatives of the people. The head of the administration is the lord lieutenant, who represents the Crown, draws a salary of £20,000, and keeps court in Dublin Castle. In the Cabinet and Parliament the interests of Ireland are looked after by a secretary of state. Counties and districts have popularly elected councils. Dublin, Belfast, Cork, Limerick, Londonderry, and Waterford are county boroughs and have representative councils of their own. The towns are partly corporate and partly governed by commissioners. The majority of the inhabitants are of the Celtic race, and the early English immigrants have completely amalgamated themselves with them. In the NE., however, there are numerous English and Scotch settlers, who being Protestant exhibit a certain amount of antagonism to the remainder of the population. It is among these that Orange lodges recruit their members. English is spoken throughout the island, but Irish is understood by more than 500,000 persons, of whom about 35,000 can speak no other language. An attempt to revive the active use of the Irish language has achieved success since 1900; Irish classes have been established in the elementary schools, and large numbers of people have taken up Irish studies. The Irish forms, with the Gaelic of Scotland and the Manx of the Isle of Man, a language group which is commonly designated as the Gaelic. The oldest monuments of the Irish language are tombstones, on which the inscriptions are recorded in an alphabet known as Ogum or Ogam. These appear to reach back to the fifth century A.D.

According to tradition, Ireland was inhabited originally by Firbolgs and Danauns, who were eventually subdued by Milesians or Gaels. In the fourth century the inhabitants were known as Scoti and Picti, and they made descents on the Roman province of Britannia, and even on Gaul. Christianity was introduced in the course of the fifth century, when St. Patrick was the chief apostle of the new faith, and in the sixth century missionaries went forth from the monasteries to convert Britain and the nations of N. Europe. At this early period Ireland appears to have been divided among numerous clans, who owned allegiance to four kings, and to an ardrigh, or monarch, to whom the central district, called Meath, was allotted. The incursions of the Scandinavians, which began in the eighth century and continued for 300 years, checked the progress of civilization. They established themselves on the E. coast, whence they made predatory incursions into the interior of the country, until they were overthrown at the battle of Clontarf, near Dublin, 1014, by Brian Boroimhe, the monarch of Ireland. From the eighth to the twelfth century Irish scholars enjoyed a high reputation for learning. In 1155 Pope Adrian IV authorized Henry II of England to take possession of Ireland on condition of paying an annual tribute. In 1172 Henry made his first descent upon Ireland. He received the homage of a number of chiefs, and authorized certain Norman adventurers to take possession of the entire island in his behalf. In the course of the thirteenth century these Norman barons, favored by dissensions among the natives, had succeeded in firmly establishing their power, but in the course of time their descendants identified themselves with the natives, even to the extent of adopting their language. At length the power of England became limited to a few coast towns and to the districts around Dublin and Drogheda, known as the "Pale." In 1541 Henry VIII received the title of "King of Ireland" from the Anglo-Irish Parliament, then sitting at Dublin, and several of the native princes acknowledged him as their sovereign. The attempt to introduce the Reformed faith led to repeated revolts, which were suppressed and the lands of the rebellious chiefs parceled out among Protestant Scotch and English settlers.

In 1641 the Irish rose in rebellion and massacred the Protestants, but they were most severely punished by Cromwell, who overran the country, 1649. Wholesale confiscations followed the suppression of the revolt, and Ireland received another large accession of English colonists. At the revolution the native Irish generally sided with James II, the English and Scotch colonists with William and Mary, and the war was not terminated until 1692, when the triumph of the Orange party again exposed the Irish to an excessive punishment. Penal statutes were passed against the Catholics, and the general dissatisfaction gave rise to numerous secret societies and to a rebellion, 1798, which was not suppressed till 1800. On January 1st of the following year the Irish Parliament voted the "Final Union" with Great Britain, and from that year dates the existence of a United Kingdom of Great Britain and Ireland. The insurrection of Emmet, 1803, was easily suppressed, but the emancipation of the Roman Catholics had to be granted, 1829, and the "tithe war" ended, 1838, with a compromise. The revolution of 1848 failed, but the formation of the Fenian Brotherhood, 1858, was a serious menace. In 1841 Ireland had 8,175,124 inhabitants. Then (1846–47) came a potato famine; thousands died of starvation and an immense impulse was given to emigration, especially to the United States. By 1851 the population had dwindled to 6,552,385. The Irish Church establishment was abolished, 1869, and, 1870, the land question was brought under debate. In 1873 the Home Rule party was founded, comprising members of all classes and denominations, and openly asserting the inalienable right of the Irish people to govern itself. The whole movement received an impetus from secret societies and

tribution in the inorganic world, it is found also in vegetable and animal organisms, constituting 0.07 per cent of the blood, or 5.5 to 8.5 per cent of the ash of blood. Iron deposited by the galvanic battery is grayish white and susceptible of a high polish. It may be rendered strongly magnetic by induction, but loses its magnetic power as soon as the source of magnetism is removed. Throughout a wide range of temperature, from red heat to near its melting point, iron is more or less plastic. At red heat it is easily forged under the hammer, and at white heat two masses of iron can be firmly and intimately incorporated with each other (welded) by hammering or pressure. Welding, though not exclusively a property of iron, is possessed by no other metal to so great a degree. It is volatilized in the heat of the voltaic arch.

Metallic iron rusts when exposed to moist air, and is gradually and completely converted into oxide; but it is not acted upon by perfectly dry, pure oxygen. Iron decomposes steam at a red heat, and is converted into oxide, hydrogen being liberated; but hydrogen passed over oxide of iron at a red heat reduces it to metallic iron, water being formed. The character of the action is here determined by the relative amounts of free hydrogen and steam. If the former predominates, reduction takes place; if the latter, oxidation. Dilute mineral acids dissolve iron, converting it into a ferrous salt, hydrogen being evolved. Ferrous carbonate occurs abundantly in nature. The most important ferrous salt is the sulphate, commonly called green vitriol or copperas, obtained as an incidental product in many metallurgical operations, and applied to manifold uses in the arts. Ferric oxide occurs abundantly in nature, as also ferroso-ferric oxide, or magnetic oxide. Iron combines with sulphur in two proportions, forming a proto- and a bisulphide. The former is used in the preparation of sulphuretted hydrogen for chemical purposes. The latter, known as pyrite or iron pyrites, occurs abundantly in nature, and is used largely as a source of sulphur in the preparation of sulphuric acid. Iron forms numerous compounds with many of the other elements, of which may be mentioned two chlorides, $FeCl_2$ and Fe_2Cl_6, and two double compounds with cyanogen, potassic ferrocyanide or yellow prussiate of potash, $K_4FeC_6N_6$, and potassic ferricyanide, or red prussiate of potash, $K_3FeC_6N_6$, which are valuable chemical reagents.

Iron is used in medicine as a tonic. It is an important constituent of the blood and animal tissues, and under ordinary circumstances the supply normally present in the food is equal to the demand; but when the number of red blood corpuscles, which contain much iron and are the special carriers of oxygen, is diminished, then their reformation may be promoted by the administration of iron preparations. Some of the salts, as the persulphate, are exceedingly astringent, and are used to arrest hemorrhage. The addition to iron of nux vomica or strychnia, or of bitter tonics like gentian, enhances its therapeutic action. The administration of iron is contraindicated by gastric or gastroenteric inflammation, and by plethora, fever, and febrile conditions generally. It is a sort of food, and is best given with or near meals. During its use, the fæces are colored dark by it, because a considerable portion usually passes through the intestinal canal unabsorbed.

In the arts, iron occurs in three forms, as wrought iron, cast iron, and steel. Wrought iron is nearly pure, and highly malleable, ductile, and weldable. It is fused with difficulty, and its finished forms are therefore generally wrought at a welding heat. It contains invariably a small amount of chemically combined carbon, 0.25 per cent or less, and intermingled cinder. Its specific gravity varies from 7.3 to 7.8. Its temperature of fusion is about 1800° C. or 3240° F. Cast or pig iron is in most respects the opposite of wrought iron. It is not in the slightest degree malleable, ductile, or weldable, but is much harder than wrought iron. It is readily fusible, and is therefore always cast in molds. There are many varieties of cast iron, exhibiting great diversity of properties. In color, the extremes are white and black, with a number of intermediate shades of gray. The hardness and brittleness vary through wide limits. White cast iron is the hardest, most rigid, and most brittle; it resists the action of the file and drill, while many of the dark varieties can be tooled with ease.

The fusibility of the different varieties of cast iron likewise differs greatly. The dark irons generally require a high heat for fusion and become thinly liquid; they fill forms well, and, as they often expand in cooling, make sharp castings, and are hence often called foundry irons. The lighter shades do not become so thinly liquid when fused, and as they contract on cooling are not adapted for castings; they usually contain a smaller amount of foreign matters, and hence, being adapted to conversion into wrought iron, are called forge irons. The specific gravity of cast iron varies from 6.9 to 7.7; its fusing point is about 1500° C. or 2700° F. Chemically, cast iron is further removed than wrought iron from the pure metal; it always contains from two to five per cent of carbon. Steel is stronger than wrought or cast iron, but is intermediate between the two in rigidity. It replaces wrought iron advantageously in construction where strength is required in small bulk; but it is excluded, except in the softest varieties, where shocks are to be encountered. Its property of hardening, combined with malleability and ductility, adapts it for the manufacture of cutting tools.

The classification of iron ores adopted by the Division of Mining and Mineral Resources, U. S. Geological Survey, is as follows: (1) *Red hematite*, including all anhydrous hematites (sesquioxides of iron) known by various names, such as red hematite, specular, micaceous, fossil, slate-iron ore, martite, blue hematite, etc. (2) *Brown hematite*, including the varieties of hydrated sesquioxide of iron recognized as limonite, gothite, turgite, bog ores, pipe ores, etc. (3) *Magnetite*, those ores in which the iron occurs as magnetic oxide, and including some martite which is mined with the magnetite. (4) *Carbonate*, those ores

which contain a considerable amount of carbonic acid, such as spathic ore, blackband, siderite, clay ironstone, etc. The character of the mineral obtained, 1905, was, approximately, eighty-eight per cent red hematite, six per cent brown hematite, and six per cent magnetite, the carbonate ore representing only about one twentieth of one per cent. The quantity of red hematite mined, 1905, was 37,540,198 long tons, over one half of which was mined in Minnesota, the state ranking next in production being Michigan, then Alabama, Wisconsin, etc. The output of brown hematite was 2,546,662 long tons. Alabama was the principal contributor of this class of ore, followed by Virginia and W. Virginia, Tennessee, etc. The magnetite variety reached a total of 2,417,274 long tons. New York was the principal contributor of this class of ore, followed by Pennsylvania, New Jersey, etc. The production of carbonate ore in Ohio and Maryland was 21,999 long tons. The number of tons of pig iron produced in the U. S. in 1908 was 15,936,018 tons, of which Pennsylvania produced over 6,000,000 tons, Ohio over 2,000,000, and Illinois, Alabama, and New York over 1,000,000 each. The value of iron and steel manufactures in the U. S. in 1905 was $905,854,152.

By far the more important source of supply of iron ore in the U. S. is that of the districts in Michigan, Wisconsin, and Minnesota embraced in the general term of the Lake Superior region. The oldest is the Marquette range; the next opened was the Menominee range of Michigan and Wisconsin, where there is greater regularity in the position of the rocks. The Gogebic range lies partly in Michigan and partly in Wisconsin. The ore formation is the most regular in the entire iron region, the product being a soft Bessemer ore. The discovery of the Vermilion range carried Minnesota into the list of leading ore-producing states, and the later developments in the Mesaba range N. of Duluth added very greatly to its output.

The Scriptures ascribe the discovery of the process of working iron to Tubal Cain, while Egyptian tradition credits it to Hephæstus, the king preceding Osiris, possibly identical with Tubal Cain. The Egyptians made iron in the district between the Nile and the Red Sea, but mostly imported it from Assyria, where it was very freely used. The Romans got iron from Great Britain (25 A.D., Strabo), but mostly from Noricum, now Styria. In 55 B.C. the Britons exported iron to the Continent in their own ships. The Romans, 120 A.D., had a great forge at Bath, supplied from the Forest of Dean. In 1355 the export of iron was stopped, and, 1483, the export of forms made in England was forbidden. Before 1756 the scarcity of wood became so great that iron was sought in N. America. In 1616 Dud Dudley succeeded in producing both cast iron and malleable iron by the aid of coke; but was obliged to abandon the process on account of the opposition from the charcoal smelters. Darby used it regularly, 1735.

The first iron produced in N. America was made in Virginia, 1622, on the James River. In 1724 Spotswood, Washington, and others built charcoal blast furnaces and exported pig iron to Bristol, England, at a cost of £3 to £4, selling at £6 per ton. In Massachusetts there was an iron mill at Lynn, 1631, blast furnace at Hammersmith, 1644, a forge at Braintree, 1646. In Connecticut a furnace at New Haven used English ore, 1657, and G. Eliot made blister steel before 1750. In New York the first works were at Stirling, 1751, where the 186-ton chain to bar the Hudson was made, 1778. In Pennsylvania the first forges were those of Hall, Nutt, and Rutter, on the Schuylkill, 1717, and the first furnace was built on the Christina River, 1726, by Sir W. Keith. The Pennsylvania trade was distinguished by the use of finery forges; nine of them and ten furnaces were built before 1750. The forges made 60 tons yearly, the furnaces 20 to 25 tons a week, stopping in summer. Between 1717 and 1770 the colonies exported about 150,000 tons pig and bar iron to England, most of it before 1750, when the making of bar iron and steel was absolutely prohibited by Parliament as a common nuisance. Coke was first used in the U. S. in the blast furnace by Oliphant at Fayette, Pa., 1836; anthracite at Mauch Chunk, 1838, by Baughman, Giteau & Co.; and raw coal by Wilkeson & Co. at Mahoning, 1846. Before 1840 the forges in the U. S. had almost ceased to make bar iron, and had been superseded for common grades by the puddling furnace, which in its turn has been superseded for rails by the Bessemer converter. Wrought iron has been largely displaced in nearly the whole line of finished products by steel. This is true of nails, wire, plates and sheets, bars, beams, angles, tees and structural iron generally, hoops, and cotton ties. See CORRUGATED IRON.

Iron Age, term used rather loosely to denote that stage of human progress at which a knowledge of iron working was attained. It does not denote any particular time, since some races might be in the stone or bronze age contemporaneously with others in the iron age.

Iron Crown, ancient diadem of the Lombard kings. It is a jeweled circle of gold, containing a fillet of iron, said to have been made of one of the nails of the true cross, presented by Pope Gregory I to Theodelinda, wife of King Antharic, 590. In 591 the crown was used at the coronation of Agilulphus; 774, at that of Charlemagne; and by thirty-four other sovereigns. Henry VII of Germany was crowned with it, 1312; Frederick IV, 1452; Charles V, 1530; Napoleon I, 1805. In 1866 it was given by the Emperor of Austria to the King of Italy, Victor Emmanuel.

Iron Mask, Man of the, d. 1703; mysterious French prisoner of state who was confined by the government at Pignerol, Savoy, 1679; was removed to Exilles, 1681; to the island of Ste. Marguerite, in the Mediterranean, 1687; and to the Bastile, 1698, where he died. He always wore an iron mask covered with velvet. His identity has never been determined, though the fact that he was buried under the name of Marchiali gave some reason for the conjecture that he was one Marechiel, who was prominent in an attempt to assassinate the king and his

ministers. Within recent years an attempt has been made to prove that he was Gen. De Bulonde, who, for raising the siege of Cuneo without cause, was condemned to imprisonment for treachery.

Iron Moun'tain, former famous iron mountain in St. François Co., Mo.; 81 m. SW. of St. Louis; was 228 ft. high, covered 500 acres, and consisted chiefly of an iron ore which yielded 55 or 60 per cent of excellent iron. The ore was softer and less siliceous than that of Pilot Knob; was very rich and uniform, nearly free from sulphur, carrying only 0.12 per cent of phosphorus. It was magnetic, with distinct polarity, and acting in several parts very strongly on the needle. By 1906 the famous mountain became exhausted of its treasure, the corporation operating it dissolved, and the region was about to be transformed into a livestock farm. The mountain had yielded the stockholders a profit of $7,000,000.

I'ronsides, Old. See CONSTITUTION, THE.

I'ronwood, name given in the U. S. to the two species of Hornbeam. The ironwood of commerce is from *Metrosideros vera*, a myrtle of E. Asia. The wood is extremely hard, dark-colored, and so dense and heavy that it sinks in water. It is often used for anchors in China and the Malayan islands. *Sideroxylon* (*Sapotaceæ*), of which the U. S. has one species, *S. pallida*, is a native of Florida. *S. inerme*, of the Cape of Good Hope, is a valuable timber tree.

IRONWOOD LEAF.

Iroquois (ĭr-ō-kwoi'), known also in history as the FIVE NATIONS and SIX NATIONS, confederation of Indian tribes, occupying territory extending from the E. watershed of Lake Champlain to the W. watershed of Genesee River and from the Adirondacks S. to the territory of the Conestoga. When first known to Europeans, the league comprised the Mohawks, or Caniengas; Cayugas, Oneidas, Onondagas, and Senecas, who, abt. 1570, had confederated themselves for offense and defense, especially against the Algonquin and Huron tribes. In 1722 the Tuscaroras of N. Carolina, who had been overthrown by the whites, found an asylum among the Five Nations, who were of the same linguistic stock. The league was originally designed to be a permanent central government rather than a temporary union of peoples and common interests. Local matters concerning individual tribes were to be determined as formerly by the local council, but after that the council was to be guided by the principles of the Federal Constitution. The Federal Government was lodged in the hands of fifty (originally forty-eight) chiefs of the highest order unequally divided among the tribes, who were also members of the tribal council of the tribe to which they belo[illegible] ure of office of these chiefs [illegible] deposed for cause, and their [illegible] things were acknowledged throughou[illegible] tire confederacy. One of the [illegible] of this league was the avowed [illegible] founders to abolish war and [illegible] peaceful expansion of the confe[illegible] induce all the tribes of men to adopt [illegible] ciples and to agree to live under [illegible] tions; notwithstanding this, the his[illegible] league is one of almost incessant [illegible] bloodshed.

In 1609, Champlain marched with [illegible] rons and Algonquins and several F[illegible] against the Iroquois, and succeeded in [illegible] ing a party of these on the banks of Lake Champlain. The confederacy never forgave the French, and the Iroquois opposition thus aroused eventually cost France her N. American possessions. The Iroquois were almost constantly at war with their Algonquin and other neighbors, E., S., N., and W. of them. The Abenakis, Mohegans, Ojibways, [illegible] hemins, Montagnais, Delawares, Illinois, Mi[illegible] n-ticokes, Shawnees, as well as the [illegible] Saponys, Catawbas, Cherokees, and [illegible] other tribes, at one time and another f[illegible] displeasure.

The Six Nations, with the exceptio[illegible] Oneidas and a portion of the Tuscaro[illegible] with Great Britain in the Revolutiona[illegible] The tribes and portions of tribes t[illegible] with Great Britain are now situate[illegible] Grand River, Canada, on lands grante[illegible] by the Crown. These consist of Cayugas, [illegible] hawks, Oneidas, Onondagas, Senecas, and Tuscaroras, who maintain nearly unchanged their ancient form of government under the protection of the British Govt. They number about 4,000.

A portion of the Oneidas occupy a reserve at Green Bay, Wis., and another, lands lying S. of Oneida, N. Y. The remnants of the other tribes are located in reservations in New York State. In 1685 the Five Nations numbered about 16,000; 1774, the Six Nations and their colonies about 12,000; 1904, including those in Canada, about 16,100. Those on reservations in New York State were 5,290 in number. Some 366 Indians classed as Senecas are in Oklahoma.

Irrawad'dy. See IRAWADI.

Irriga'tion, in the broadest sense of the term, all artificial methods of using water for agricultural purposes. The imm[illegible] of irrigation on the consistence o[illegible] to soften it and render it more ea[illegible] trable. Hence, in dry climates en[illegible] is frequently applied, before plow[illegible] the earth to the depth of a [illegible] drenching it; the ultimate effect of [illegible] tinued irrigation is to condense and h[illegible] surface. Irrigation affects the quali[illegible] soil by introducing into it air and oth[illegible] and vegetable and mineral matter held [illegible] pension or solution by the water. [illegible] cases the substances so introduced are [illegible] ficial to vegetation, but in some they [illegible] noxious. Irrigation also acts on arable [illegible]

A GARDEN IN NORTH CHINA.

IRRIGATION HAS BEEN PRACTICED HERE FOR THOUSANDS OF YEARS.

THE EGYPTIAN GOVERNMENT'S IRRIGATING CANAL BELOW CAIRO.

THE MAIN CANAL OF CANADA'S 8,000,000-ACRE RECLAMATION PROJECT.

THE OPENING OF THE UNITED STATES TRUCKEE-CARSON PROJECT (NEVADA).

THIS SYSTEM WILL ULTIMATELY IRRIGATE 215,000 ACRES. THE DAM IS BUILT OF SOLID CONCRETE.

HUNTLEY, MONTANA.

WATER PRODUCES TOWNS ON THE DESERT HERE.

THE YUMA DAM

A GREAT ENGINEERING FEAT OF THE U. S. RECLAMATION SERVICE. IT EXTENDS NINE TENTHS OF A MILE ACROSS THE BED OF THE COLORADO.

A 320-ACRE RANCH.

BECAUSE OF LACK OF WATER THIS WILL HARDLY SUPPORT A FAMILY.

AN IRRIGATED RANCH OF 10 ACRES.

THIS WILL KEEP A FAMILY IN COMFORT

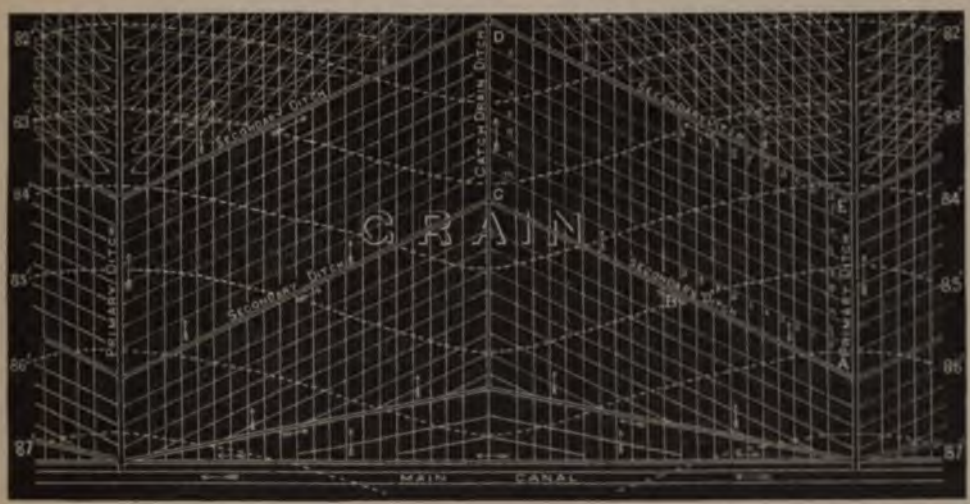
IRRIGATION.

facilitating the decomposition of soluble organic and inorganic matter contained in it, and carrying off such matter from it. When it is first introduced it often injuriously affects the subsoil by charging it with water, which stagnates in it and renders it cold and sour to the roots of plants which descend into it.

Irrigation is used for two general purposes: to aid in the production of crops in regions which are naturally supplied with rain, and to reclaim desert or arid countries. As an adjunct to the natural rainfall of summer, irrigation is little used in the U. S., where land is not yet of sufficient value to make its practice generally profitable. As a means of reclaiming arid wastes, irrigation in some form has been used to advantage from the earliest times. In the U. S. the subject has become one of great importance in the efforts to make fertile parts of the "great American desert" region. A National Irrigation Congress has been held annually since 1892, and a National Irrigation Act was passed by the U. S. Congress, June 17, 1902, among whose provisions was one for the establishment of a Reclamation Service under the U. S. Geological Survey, to investigate and report on irrigation projects for the approval of the Secretary of the Interior. In 1889 in the U. S., 3,631,381 acres of land in arid and semiarid states and territories were irrigated, and in 1907, 10,125,000 acres of arid and semiarid lands and 875,000 acres in rice states, making a total of 11,000,000 acres, at an average cost per acre of $13.47. [illegible] reat irrigation works undertaken [illegible] nt was the feat of [illegible] uckee River, Ne- [illegible] carries them [illegible] r, whence [illegible] ied out [illegible] Ari- [illegible] y

In Colorado the waters of the Gunnison, carried to supplement the flow of the Uncompahgre, will irrigate 130,000 acres in the valley of the latter. In N. Wyoming, the Shoshone dam, over 300 ft. high, will store water which through hundreds of ditches and canals will irrigate some 100,000 acres. By a dam on the Snake River, in S. Idaho, about 100,000 acres of sage brush will be converted into fertile farms. At Yuma, Ariz., a reservoir created by a dam across the Colorado supplies, through two canal systems, lands in California and Arizona.

Irrigation was extensively carried on by the Indians of S. America, and of Arizona and New Mexico, but generally in a primitive manner. Italy and Spain, Egypt and India, present extensive operations of an equally primitive nature. The British, by the construction of the dam at Assouan on the Nile, have rendered the greatest service to irrigation in Egypt. In India they have extended irrigating facilities on a grand scale. In the U. S. experience alone can determine the proper quantity and seasons. The modes of application are by flowing with running, and flooding with partially stagnant, water; by infiltration from superficial ditches or furrows, and, more rarely, from underground conduits; and by sprinkling with scoops or other light hand implements. The evening hours are considered the most favorable time, but this rule is by no means universally observed.



Irrigating System for Grain.

Irrigating canals are usually derived from rivers. The water is raised to the required level by a weir or dam thrown across the river, and the head of the canal is placed above the dam. In the deltas of rivers, where the ground to be irrigated is little, if at all, above the level of the water in adjacent portions of the rivers, the problem is solved much more simply and at a much lessened expense than in the general case where the river flows along the [illegible] est line of the valley, and where the adjacent lands rise from the river banks on either

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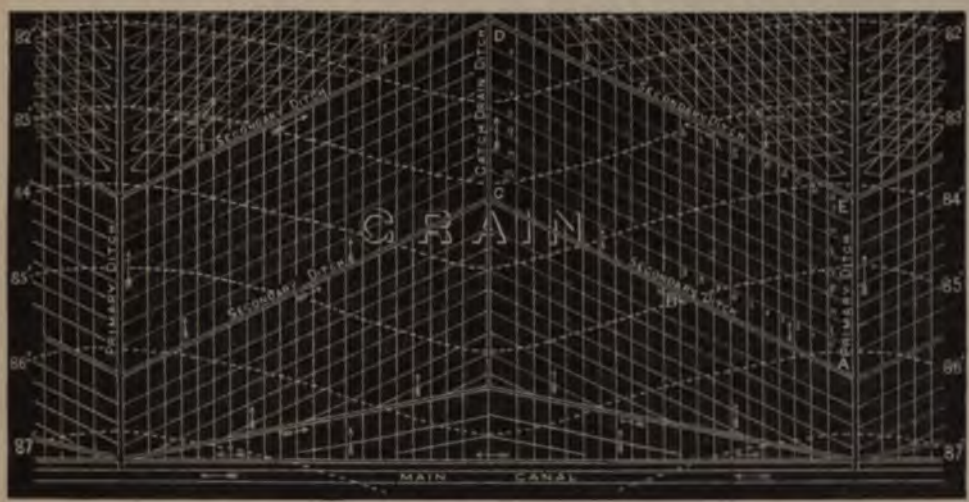

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side. In this latter case it is necessary to fix the head of the canal at a considerable distance above the land to be irrigated, and consequently a line of canal often many miles in length must be made to bring the water out on the level of the ground.

The increase of production which results from irrigation in warm climates, where the rainfall is insufficient to produce a crop, is sufficient to justify the expenditure required to put the system into operation. It is estimated that the canals and primary ditches, including dams, head works, and all necessary arrangements, excepting the secondary and other minor ditches, can be constructed on the plains of California at an expenditure which may vary from $10 to $20 per acre. It must be borne in mind, however, that the features of the country are in general extremely favorable, and that the gates, head works, and other constructions are made of wood, and that they must be replaced from time to time. The minor ditches, it is estimated, may cost from $5 to $10 per acre, which makes the total probable outlay to vary between $15 and $30 per acre. The simplicity of the irrigating system which is practicable on the plains of California is in strong contrast to the intricacies which developed in Italy, where the Cavour Canal cost over $17,000,000, but doubled the population of the Po valley in forty years. See CANAL.

Ir'tish, river of N. Asia; rises in the Altai Mountains, in N. Mongolia, flows NW. through the Russian governments of Semipalatinsk and Tobolsk, till it joins the Obi, after a course of about 1,700 m., 180 m. N. of the city of Tobolsk. The ferry of the Irtish was called the "ferry of death," because it took the Russian exile to political and often to physical death.

Ir'vine, William, 1741–1804; American military officer; b. near Enniskillen, Ireland; became surgeon of a British ship of war during the French war, after which he emigrated to N. America, and settled at Carlisle, Pa.; member of the Provincial Convention of Pennsylvania, 1774; appointed colonel of the Sixth Battalion of the Pennsylvania line, 1776; member of the court martial for the trial of Gen. Charles Lee, 1778; appointed brigadier general, 1779; served in New Jersey and at the battle of Bull's Ferry under Wayne; in 1781 took command of the defenses of the NW. frontier; member of the Continental Congress, 1786–88, and the Federal Congress, 1793–95; was a commissioner for settling the accounts of the U. S. with the several states; member of the convention for revising the Constitution of Pennsylvania; took part in the campaign against the insurgents in the "Whisky Insurrection," 1794, etc.

Ir'ving, Edward, 1792–1834; Scottish religious leader; b. Annan, Dumfriesshire; in 1819 became assistant to the celebrated Dr. Chalmers, and three years later accepted a call from a Presbyterian congregation in London, where his eloquence and his prophetic utterances attracted crowds of hearers. In 1825 he published "Babylon and Infidelity Foredoomed," and in the following year his translation from the Spanish of "The Coming of the Messiah in Glory and Majesty." In 1828 he began to preach the entire humanity of Christ, which caused a great stir in the Presbyterian Church. In 1830 there appeared in his congregation phenomena which Irving and others regarded as the revival of the miraculous gifts of the early church—the gifts of "prophesying" and of "tongues." That year Irving was prosecuted for heresy before the Presbytery of London for his teachings concerning the nature of Christ, and was deposed, 1833. Meanwhile, 1832, he had removed, with those who adhered to him, to a chapel, where the "apostles" of the congregation reordained him as angel or pastor, and there he officiated until a little while before his death. He was buried in Glasgow Cathedral. The followers of Irving became popularly known as Irvingites, but this appellation is rejected by the body of Christians holding the views of which he was an exponent. See CATHOLIC APOSTOLIC CHURCH.

Irving, Sir Henry, original name JOHN HENRY BRODRIBB, 1838–1905; English actor; b. Keinton, Somersetshire; originally intended for mercantile life, but forsook commerce for the stage, and made his first appearance at the Lyceum Theater, Sunderland, 1856, in Lytton's "Richelieu." In the first three years of his dramatic career he played a great number of characters. In 1866, at the St. James Theater, London, he won particular applause as *Doricourt* in "The Belle's Stratagem"; 1870, performed the part of *Digby Grant* in Albery's play, "Two Roses," which ran for 300 nights; 1871, at the Lyceum Theater made his first success in a serious part as *Mathias* in "The Bells"; subsequently played *Hamlet, Othello, Richard III*, and a number of other characters. In 1878 he became manager of the Lyceum Theater, and by the magnificent setting of his productions and his attention to detail gave his theater a national reputation. In 1881 he and Edwin Booth played together in "Othello," each taking the parts of *Othello* and *Iago* alternately. He afterwards made several visits to the U. S. with his Lyceum company and Ellen Terry; knighted 1895. His versatility in a wide range of important rôles was remarkable. In characters so different from each other as *Robert Macaire, Bill Sikes, Harry Dornton, Captain Absolute, Junkle, Charles I, Shylock, Louis XI*, the differentiation was perfect. His *Louis XI* and his dual character of *Lesurques* and *Dubosc* in "The Lyons Mail" were remarkable impersonations.

Irving, Roland Duer, 1847–88; American geologist; b. New York City; Prof. of Geology and Mineralogy in Univ. of Wisconsin from 1869 till his death; State Geologist of Wisconsin, 1873–79; also engaged on U. S. Survey; publications relate chiefly to Wisconsin; include "The Classification of the Early Cambrian and Pre-Cambrian Formations."

Irving, Washington, 1783–1859; American author; b. New York; school education not continued after his sixteenth year, when he began to study law; made his first literary venture, 1802, by printing in the columns of a daily paper local sketches under the pen name of "Jonathan Oldstyle"; traveled abroad for

two years; was admitted to the bar on his return, 1806, but abandoned the profession to join the firm of his brothers, merchants in Liverpool and New York, which failed, 1817, throwing him on his own resources. He began, 1807, with his brother William and James K. Paulding, the amusing serial "Salmagundi"; wrote, 1808, "History of New York, by Dietrich Knickerbocker"; lived abroad 1815–32, where he wrote and sent to New York, 1818, the essays composing the "Sketch-book," printed over the signature of "Geoffrey Crayon," which laid the foundation of his permanent fame; 1822, "Bracebridge Hall" brought him £1,000; 1824, "Tales of a Traveler," £1,500. He published, 1828, "History of the Life and Voyages of Christopher Columbus," for which he received 3,000 guineas and from George IV a gold medal; 1831, its continuation, "Companions of Columbus"; 1829, "The Conquest of Granada," and, 1832, "The Alhambra"; was U. S. Secretary of Legation in London, 1829–32. He returned then to America and accompanied Ellsworth in his journey for removing the Indian tribes to the W. of the Mississippi, narrating his observations in his "Tour on the Prairies"; published, 1836, "Astoria," a narrative of the exploration of Oregon; 1837, "Adventures of Captain Bonneville," and contributed to the *Knickerbocker Magazine* a series of articles, afterwards published in the volume entitled "Wolfert's Roost." He was U. S. Minister to Spain, 1842–46; published, 1850, "Mahomet and His Successors," and later the "Life of Washington"; resided during the closing years of his life at Sunnyside, Tarrytown, N. Y. He was never married.

Ir'vingites. See IRVING, EDWARD.

Ir'win, Jared, 1750–1818; American statesman; b. Mecklenburg Co., N. C.; took an active part in the cause of independence during the Revolutionary War; was a member of the first legislature of Georgia after independence was achieved, and of the state convention which ratified the Constitution of the U. S. He was governor of the state, 1796–98 and 1806–9; member of the constitutional conventions of 1789, 1795, and president of the convention that formed the constitution of 1798. As governor, 1796, signed the act abrogating the Yazoo fraud.

Is, important city of ancient Babylon, eight days' journey N. of Babylon, on the Euphrates; name signifies *bitumen*, which was carried thence to Babylon for building purposes. The site has been identified by cuneiform inscriptions.

I'saac, second patriarch of the Hebrews; son of Abraham and Sarah, younger brother of Ishmael, and father of Jacob and Esau by Rebekah. The narrative of his life is contained in Genesis, according to which he was born when his father was 100 years old; was about to be sacrificed by his father on Mount Moriah; was saved by divine interposition; lived partly as a nomad, partly as an agriculturist, in the S. region of Canaan and in Philistia, and died, blind, at the age of 180.

Isaac I (COMNENUS), d. 1061; Byzantine emperor; was brought up by the Emperor Basil II, and was raised to the throne by a conspiracy in the place of Michael VI. He repulsed the Hungarians, 1059, but was a weak and incompetent ruler, and abdicated in the same year. He left no son, but the family of Comneni, after an interval of twenty years, occupied the Byzantine throne for a century.

Isaac II (ANGELUS), d. 1204; Byzantine emperor; descended from the family of Comnenus, and raised to the throne by a revolution, 1185. In 1195 his brother, Alexis III, compelled him to abdicate and deprived him of his sight, but, 1203, the crusaders again placed him on the imperial throne, whence he was driven by Alexis Ducas, who put him to death.

Isabel'la I (THE CATHOLIC), 1451–1504; Queen of Castile and Leon; daughter of John II of Castile by his second wife, Isabella of Portugal. Until her twelfth year she lived in retirement; but on the birth of the Princess Juana, her brother, King Henry, removed her to court, the better to prevent the formation of a party for securing the succession to her instead of Juana. Many of the nobles, believing that Juana was illegitimate, conspired in favor of Alfonso, brother of the king, and on his death (1468) offered the crown to Isabella. She refused it, but effected an accommodation with her brother by which she was recognized as heir to Castile and Leon, with the right to choose her own husband, subject to the king's approval. Notwithstanding Henry's disapproval, she married, 1469, Ferdinand, Prince of Aragon.

Henry died, 1474, and Isabella was proclaimed queen; but it was not until after a war with Alfonso of Portugal, who had been affianced to Juana, that her authority was fully recognized. From this time her career was brilliant. She applied herself to reform the laws and internal administration of the realm, to encourage literature and the arts, and to modify the stern and crafty measures of her husband. Though the life and soul of the war against the Moors, in which she personally took part, even wearing armor, which is still preserved at Madrid, she was opposed to the cruelty which was then the established policy toward the people; and it was with reluctance that she decreed the expulsion of the Jews from Castile and gave her consent to the introduction of the Inquisition. The encouragement of Christopher Columbus is the deed by which she is best known to posterity; the squadron with which he discovered America was equipped at her expense.

Isabella II, 1830–1904; Queen of Spain; b. Madrid; succeeded her father, Ferdinand VII, 1833, under the guardianship of her mother, but war at once broke out, the followers of Don Carlos asserting that the Salic law, which had been the rule of succession in the Bourbon family in France, also held good for Spain, notwithstanding the Pragmatic Sanction of the old Castilian law of female succession published by Ferdinand, 1830. The first Carlist war lasted till 1840, with varying fortunes.

In 1843 she was declared of age; married her cousin, Don Francisco, 1846—a purely political marriage, arranged through the influence of Louis Philippe—and after a reign disturbed by many violent revolutions was deposed, 1868, and 1870 abdicated in favor of her son, who, 1875, succeeded as Alfonso XII, the short reign of Amadeus and a republic having intervened.

Isabella, or **Isabela,** first city founded by Europeans in the New World, so called in honor of the Queen of Spain. It was founded by Columbus, December, 1493, on a small bay of the N. shore of Santo Domingo, about 25 m. W. of the present town of Puerto Plata. The site was low and unhealthful. Later, 1497, Santo Domingo City was founded and became the capital of the colony; gradually Isabella was abandoned, and only a few ruins, overgrown with tropical vegetation, remain to mark its site.

Isabey (ē-zä-bā′), **Eugène Louis Gabriel,** 1804–86, French genre, landscape, and marine painter; b. Paris; son of Jean Baptiste Isabey, miniature painter (1767–1855); was awarded first class medals at the salons of 1824 and 1827 and at the Paris Exposition, 1855; was made an officer of the Legion of Honor, 1852. Pictures by him are in all the principal museums in France, including four in the Luxembourg Gallery, Paris. "French Hospitality" is in the collection of Mrs. W. H. Vanderbilt, New York; three marines are in that of W. T. Walters, Baltimore.

Isabey, Jean Baptiste, 1767–1855; French painter; b. Nancy; made a specialty of portraiture, largely miniatures; painted on ivory, on porcelain, and in enamel, and very many of his portraits are water colors, or sepia drawings with slight touches of color. Some of his sepia drawings are very large and contain many figures, but are still very delicately finished. Among his important works are, at the Louvre, the large water color of "The Staircase of the Louvre Museum"; at the Museum of Versailles, "Napoleon Visiting a Factory at Rouen" and "Napoleon Visiting a Factory at Jouy"; at Windsor Castle, "The Congress of Vienna"; and in England, in private hands, the large painting on ivory of Napoleon and his marshals, generally called "La Table des Maréchaux."

Isæus (ī-sē′ŭs), one of the ten Attic orators, flourished in the fourth century B.C.; was instructed in oratory by Lysias and Isocrates; composed judicial orations for others; and founded a school of rhetoric. In antiquity sixty-four orations were ascribed to him; eleven are extant.

Isaiah (ī-zā′yä), first of the great Hebrew prophets, son of Amoz, flourished under Kings Uzziah, Jotham, Ahaz, and Hezekiah, from abt. 760 to 700 B.C. The leading themes of his prophecies are denunciations of vice and oppression, announcements of impending ruin, and the promise of regeneration and a universal reign of justice. The sublimity of diction and thought in the main portions of the Book of Isaiah gives him the highest rank among the prophets. The last twenty-seven chapters, in which Cyrus and the fall of Babylon are repeatedly spoken of, are generally considered by critics to be by a later author.

Isal′co. See IZALCO.

Isambert (ē-zäṅ-bär′), **François André,** 1792–1857; French jurist; b. Aunay; gained a great reputation at the bar as the chief defender of the rights of the free negroes of the French W. Indies; was a member of the Chamber of Deputies, 1830–48; one of the founders of the French Geographical Society and of the Society for the Abolition of Slavery, of which he was long the secretary. He edited (1820–27) the annual volume of modern laws; published, with other writers, the vast collection of ancient French legislation (1822, esq., 29 vols.), a "Manual for the Publicist and Statesman," "The Religious Condition of France and Europe," a "History of Justinian," translated the complete works of Flavius Josephus and the "Ecclesiastical History" of Eusebius, and wrote a large work on the "History of the Origin of Christianity," besides contributing to many periodicals and writing numerous articles for Didot's "Nouvelle Biographie Générale."

Isar (ē′zär), river of Germany; rises in Tyrol, enters Bavaria, and flows, after a course of 200 m., into the Danube. Munich and Landshut are situated on its banks.

Isauria (ī-sä′rī-ä), district of Asia Minor, between Phrygia, Lycaonia, Cilicia, and Pisidia; was in ancient times in ill repute for the fierceness and daring rapacity of its inhabitants. In 78 B.C. it was conquered by the Romans, but when, in the fourth century A.D., the Isaurians united with the Cilicians, they became a formidable enemy of the Byzantine Empire, and two of their race occupied the Byzantine throne—Zeno, 474–91, and Leo III, 717–41. Its capital was Isaura (now Zengibar Kalesi), situated on a high hill not far from the cañon of the Calycadnus. The elevated site commands a view of almost the entire Isauria. It is not known when the seat of government was transferred to Nea Isaura, which was the city besieged by Servilus, as is proven by the Sallust fragments discovered in Orleans, 1886. Isauria was explored by Sterrett, 1885.

Iscanderoon′, Scanderoon′, or **Alexandret′ta,** extreme N. seaport of Syria; on the E. coast of the Gulf of Alexandretta, the ancient Gulf of Issus. It has the best harbor on the Syrian coast, and is the sea outlet of the Syrian Gates, hence of Aleppo and the W. Euphrates basin. Sometimes more than 1,000 loaded camels enter the town in one day. Pop. abt. 7,000.

Ischia (Is′kē-ä), mountainous island of igneous origin; in the Mediterranean, at the entrance of the Bay of Naples; 7 m. WSW. from Cape Miseno, the nearest point on the mainland. It is rudely circular, about 20 m. in circumference, not reckoning the indentations of its bays. Its highest point is Monte Epomeo, 2,617 ft. It was early peopled by Greeks from Asia Minor. Its mild climate, exquisite

scenery, and fertile soil (producing abundant fruits) have made it throughout the year a favorite resort of strangers in all ages. Ischia has frequently suffered from volcanic eruptions and earthquakes. One eruption (474 B.C.) drove away many of the Greek colonists; another (1302) almost depopulated the island. In 1883 the cities of Casamicciola, Ischia, and Forio were almost utterly destroyed. All these towns have in great part been rebuilt. Pop. (1901) 26,891.

Ise (ē'sā), headquarters of the Shinto priesthood of Japan; a province in central Japan, adjoining Yamato, the center of its historic unity; lies along the W. side of the Bay of Owari, and the temples which give the province its fame are found close to the town of Yamada. These are plain edifices constructed of white pine, with thatched roofs; they are decorated with no paintings, images, or carvings; every twenty years they are renewed, with devout and elaborate ceremonies, their unbroken historic continuity being thus maintained. Few Japanese fail to make a pilgrimage to the Ryo-dai-shin-gu (two great divine palaces), to invoke the protection of Daishingu-Sama, bringing back some charms wrapped in oil paper. In every Japanese house will be found a shelf on which is placed a miniature Shinto temple, containing paper packets inscribed with the names of the various gods. Twice a year there are festivals at Ise, which are supposed to effect the purification of the nation from sin.

Iser (ē'zĕr), river of Bohemia; an affluent of the Elbe; rises in Prussian Silesia and flows SW., passing through one of the most picturesque and busy valleys of Bohemia; length, 135 m.

Isère (ē-zār'), French river which rises in Mt. Iseran, Savoy, flows W. and SW. past Grenoble and Romans, and joins the Rhone 4 m. from Valence; length, 150 m.

Ishbosheth (ish-bō'shĕth), son and successor of Saul; was acknowledged king at Mahanaim by the greatest part of Israel, while David reigned at Hebron over Judah; was involved in a long and unsuccessful war against David, abandoned by Abner, and assassinated.

Ish'im, large river of Siberia, in the Government of Tobolsk, flows N. 700 m. through a sterile region, and enters the Irtish 120 m. SE. of Tobolsk. On its banks are the important towns of Ishim and Petropaulovsk.

Ishim, town in W. Siberia; 150 m. S. of Tobolsk; founded 1630; is one of the oldest settlements in Siberia; noted for its midwinter fair, calling together 20,000 people, and giving rise to business transactions amounting to $4,000,000.

Ishmael (ish'mā ĕl), son of Abraham and Hagar, the Egyptian handmaid of Sarah; was expelled, together with his mother, from his home when Sarah gave birth to Isaac. The Bedouin tribes of N. Arabia, occupying the region between the peninsula of Sinai and the Persian Gulf, are said to descend from Ishmael, and possess many Ishmaelitic traditions.

Ishmael I, d. 1523; founder of the dynasty of the Sophis of Persia; was a descendant of Ali, son-in-law of Mohammed; began his reign 1502; gained many victories, and established the Persian throne on a solid basis.

Ishmael II, d. 1577; succeeded to the throne of Persia 1576; murdered eight of his brothers; was poisoned by his sister out of religious zeal.

Ish'peming, city of Marquette Co., Mich.; 15 m. WSW. of Marquette; is the center of the great Lake Superior iron-ore region; and on the Marquette range, the most productive of the four iron ranges. There are fourteen mines in the Ishpeming district. Gold and silver were discovered here, 1877; were first worked 1881. The first stamp mill was erected 1884. Marble is also found. There are several foundries, blast furnaces, and machine shops.

Isido'rus of Char'ax, geographer of the first century; author of a Greek work, extant only in fragments, in which the Greek and Roman world and the Parthian Empire were described.

Isidorus of Seville', d. 636; saint of the Latin Church; became Bishop of Seville abt. 600, and was esteemed the most eloquent orator, the profoundest scholar, and the ablest prelate of his age; wrote on science, art, history, and theology; most important of his works, "Originum sive Etymologiarum Libri XX."

Isido'rian Decre'tals. See DECRETALS, FALSE.

I'singlass, gelatin prepared from the air bladder of various sturgeons and other fish, such as the cod, the weakfish, and the hake; is used in preparing jellies, confections, blancmange, gum drops, etc.; in fining wines and liquors; as a test for tannic acid, as an ingredient in court plaster; as a size for delicate fabrics, etc.

I'sis, principal goddess of the Egyptians, wife of Osiris and mother of Horus, with whom she formed the most popular triad in Egyptian mythology. She was adored as the great benefactress of Egypt, who had instructed her people in the art of cultivating wheat and barley. Her worship passed into Greece and Italy, and was established in the first century B.C. at Rome, where it became popular. In works of art she usually appears with the figure and face of Juno, arrayed in a long tunic, wearing a wreath of lotus flowers, and in her right hand a sistrum. See OSIRIS.

Isis, classical Latin name for the Thames River in England, still often employed in the same sense in English poetry and belles-lettres. The principal tributary of the Thames, which passes by Oxford, is also called Isis.

Iskimid (is-kē-mĕd'). See ISMID.

Isla (ēs'lä), **José Francisco de**, 1703–81; Spanish author; b. at Segovia; entered the order of the Jesuits, was expelled with them, 1767, and died at Bologna. His sermons attracted attention as early as 1729, but his fame he principally obtained by his satirical romance, "Life and Adventures of Friar Gerundio de Campazas," a satire on the vulgar

preachers of the day. The first volume of this work was published, 1758, without the knowledge of the author, but, 1760, its sale was forbidden. The second volume did not appear until 1772, in London and in English, and then in Spanish at Bayonne shortly after. The whole work was published in Madrid, 1813. He also wrote "Cicero," a satirical poem, of which the manuscript is in the library of Boston, its publication in Spain having been forbidden.

Is'lam, religious system of Mohammed. See MOHAMMED.

Is'lands, relatively small bodies of land surrounded by water. Islands are produced in various ways. They may be cut off from the mainland by the action of waves and currents. They may be produced by the partial submergence of a rugged or mountainous land; by far the greater number of islands near the continents have been thus formed. Many islands are formed by the rise of lake waters in warped or obstructed valleys. Volcanic islands are built up from the sea bottom, not only along continental shores, but also alone in mid-ocean. Mid-ocean islands are volcanic or coral, with few exceptions. On taking a definite attitude with respect to the sea-level islands suffer various changes. Like the mainland coast, they may be consumed by the waves; when favorably situated islands may be tied to the mainland by sand bars, or they may be welded to continents by the outward growth of deltas.

With respect to temperature, islands are tempered by the waters that surround them. They are generally well watered, but may have a rainy slope to windward and a dry slope to leeward, as on the Hawaiian Islands. With respect to fauna and flora, islands may be divided into continental and oceanic groups. The former generally possess animals and plants derived from the adjoining mainland at a time when the two were connected. In the case of oceanic islands remote from continents, the scanty fauna and flora are restricted to such forms as may have crossed from other lands by air or water.

Isle of France. See MAURITIUS.

Isle of Man. See MAN, ISLE OF.

Isle of Pines. See PINES, ISLE OF.

Isle Roy'al, large island in Lake Superior, belonging to Michigan; about 20 m. from the coast; 40 m. long by 8 to 12 broad. It has rich copper mines; its shores afford fine fishing ground; large bay on the S. side called Siskawit; Washington Harbor at the W. end is an excellent port; no permanent population.

Isles of Shoals, group of eight small islands in the Atlantic; about 10 m. SE. of Portsmouth, N. H.; are barren and almost without vegetation; the few inhabitants live mostly by fishing. On White Island is a lighthouse; on Appledore and on Star Island are large hotels for summer tourists.

Isle of Wight. See WIGHT, ISLE OF.

Ismail (ēs-mä-ēl'), city of Bessarabia, Russia; 125 m. S. of Kishineff; on the Kilia, the N. mouth of the Danube; was given to Moldavia, 1856, but has belonged to Russia since 1878; has been taken by assault and sacked three times—1770, 1790, and 1791. The fortifications were destroyed on the evacuation of 1856. Pop. (1897) 33,750.

Ismail Pasha', 1830–95; fifth Viceroy and first Khedive of Egypt; b. Cairo; son of Ibrahim Pasha and grandson of Mehemet Ali. On the death of his father (1848) he opposed the new viceroy, Abbas Pasha, who died the following year. A favorite of the next viceroy, his uncle Saïd Pasha, he was intrusted with the government during Saïd's pilgrimage to the holy places of Arabia and during his visit to Europe. Then he was appointed general in chief of the Egyptian armies, and subdued the insurgent tribes on the frontier of the Soudan. Saïd died in 1863, and Ismaïl succeeded. First he opposed, then favored, the completion of the Suez Canal. By two firmans from the sultan (1867) he obtained the semi-independent title of khedive (master), with almost every attribute of sovereignty. He secured a third firman (August 4, 1868) which set aside the customary Mussulman order of succession (among the Mussulmans not from father to son, but to the oldest male member of the family), and declared the investiture of Egypt hereditary among his descendants in direct line. The imminent bankruptcy of Egypt and the dissatisfaction of a part of the Egyptians with the khedive's government led Sultan Abdul Hamid to depose him, 1879, and appoint Mohammed Tewfik Pasha, the eldest son of the khedive, in his stead. The deposed ruler withdrew to Naples; but, 1888, removed to Constantinople, where he died.

Ismailia (Is-mä-ē'lē-ä), town of Lower Egypt; on the N. shore of Lake Timsah, and on the Suez Canal; founded, 1863, to serve as the central point for the construction of the canal, and named after the khedive, Ismaïl Pasha. Its situation gave promise of considerable commercial importance, which has not been fulfilled.

Ismailia, or Ismaih'ya. See GONDOKORO.

Ismaïlis (ēz-mä-ē'lēz), almost extinct sect of Mussulman heretics. They first came into prominence in the ninth century under Babek, in Aderbidjan, whence their doctrines spread throughout the Mussulman world. During four years they were able to resist all the power of the Caliph Motassem. There is hardly a crime or heresy of which they were not accused. Their outward practice was very devout, but it was charged that their private life was of the worst, and that they were materialists and atheists. They paid special honor to the imam Mohammed ben Ismaïl, whence their name.

Ismid (īs-mēd'), or **Isnikmid'** (anc. *Nicomedia*), town in Asia Minor, on the NE. extremity of the Gulf of Nicomedia. Here the Emperor Diocletian began his persecution of the Christians (303), and here he abdicated the throne. The city contains few Roman or Byzantine ruins. As episcopal see of the Orthodox (Greek) Church, it, with Nice, or Nicæa,

also in Asia Minor, ranks second to Constantinople. On the main highway between Constantinople and the East, it has always been an important and prosperous city.

Isnik (Is-nēk'), ancient name, *Nicæa*, town in Asia Minor; at the E. end of the Lake of Isnik. The first Ecumenical Council, 325, was held here. The mediæval double walls with towers and gates are still in good preservation; so, too, is Yeshil Djami (the green mosque), the finest existing monument of Seljuk art. Carved fragments of marble and stone from ancient buildings everywhere dot the ground, and are built profusely and indiscriminately into the modern houses. The present town, comprising about 150 Mussulman and Greek families, occupies only a part of the former site.

Isobar'ic Line. See CLIMATE.

Isoclinic (I-sō-clĭn'ĭk), **Isodynam'ic, and Isogon'ic Lines,** lines of equal inclination, equal force, and equal declination, which being laid down on maps represent the magnetism of the globe as exhibited at the earth's surface in the varying intensity of the force, the varying dip or inclination of the needle, and its varying declination from the true meridian.

ISOGONIC LINES.

Isocrates (I-sŏk'rā-tēs), 436–338 B.C.; Greek orator; b. Athens; son of Theodorus; was a disciple of Socrates and Theramenes, and subsequently attained considerable popularity as the founder of a school of rhetoric at Athens. Cicero declared him the first to perfect the melody of Greek prose. The Alexandrian critics assign him the fourth place in the canon of Greek oratory. His style is ostentatious and elegant, rather than graceful and pleasing; is best remembered by the discourses known as the "Areopagiticus" and the "Panegyricus"; died of voluntary starvation.

Isoge'otherms, imaginary surfaces of equal temperature within the earth. Consider a temperature somewhat higher than those observed at the surface of the earth, for example, 200° F. If we descend in the earth, we find the temperature of the rock gradually increasing until at a certain point it is 200°; and beyond that point it is more than 200°. The point is part of an indefinitely thin sheet or zone which in a general way extends horizontally through the rock and everywhere has the same temperature, the rock above it being cooler and that beneath warmer. Such a zone or imaginary surface of equal temperature is an isogeotherm. An isogeotherm may correspond to any assignable temperature represented in the earth. The geologic processes by which the earth's crust is continually transformed involve the local production of heat through rock crushing, the local production and local consumption of heat through chemical reaction, and the local transfer of heat through the circulation of lavas and of waters; and every such change produces a local deformation of the isogeotherms.

Isola (ē'sō-lä) **Bel'la.** See BORROMEAN ISLANDS.

Isola del Liri (lē'rē), town in the province of Caserta, S. Italy. The immense water power furnished by the Liri and the Fibreno is here utilized for manufacturing paper, linen, woolens, chemical products, etc., on a large scale, and also for working metals.

Isom'erism, in chemistry, the relation between two or more substances having the same composition, but different properties. It was at first assumed that substances having the same chemical composition necessarily are identical, but, 1823, Mitscherlich showed that the element sulphur crystallizes in two forms, one of which can be easily transformed into the other, and that calcspar and arragonite, two distinct substances, have the same composition. The compounds of carbon especially present many examples of isomerism. To-day isomerism is one of the most common, as well as one of the most interesting and important facts of chemistry.

Isopoda (I-sŏp'ō-dä), order of crustacea, including the sow bugs, pill bugs, salve bugs, etc. All have a flattened body, in which the head, thorax, and abdomen are clearly distinguishable. The appendages of the head are for sensation and for eating, those of the thorax are for locomotion, while those of the abdomen are modified into gills.

Isop'tera, term sometimes applied to that group of insects which includes the white ants (*Termites*).

Isother'mal Lines. See CLIMATE.

Ispahan (Is-pä-hän'), or **Isfahan',** city of Persia and capital of the province of Irak-Ajami; on the Zayanda-Rud (Zendarud), is

one of the oldest cities in Persia, and is with reason identified with Ptolemy's "Aspadane." Ispahan was an important city and well known in Sassanian and in mediæval times, but it suffered much under the Tartar invasion in the fourteenth century. Recovering from this, however, it again flourished, and in the seventeenth century, when Shah Abbas made it his residence and the capital of Persia, it became one of the most magnificent cities of Asia. In 1722, however, it was taken and sacked by the Afghans, and although it was retaken, 1729, by Nadir Shah, yet Teheran became the capital of Persia, and Ispahan fell into decay. The buildings and public works of Ispahan are among the finest not only in Persia, but in the East. Among its splendid monuments is the bridge over the Zendarud, 1,000 ft. long, resting on thirty-four arches, and bearing arched galleries. Notable also is one of the palaces of Shah Abbas the Great; it is called Chihil-Sutun, "the forty columns"; its front is formed of a double row of columns, each 40 ft. high and resting on a base formed by the united backs of four lions in white marble. There is also a famous mosque, the handsomest in Persia, called Mesjid-i Shah, or "royal mosque," the vast dome of which rises among a forest of spires, towers, minarets, and open galleries. These and many other wonderful monuments are rapidly decaying, and are surrounded by ruins. Pop. (1908) 80,000.

Israel (ĭz'rā-ĕl), name bestowed on Jacob (*q.v.*) when an angel wrestled with him at Peniel; afterwards the distinctive name of his descendants, the Jewish people, and particularly that portion of it which formed the N. kingdom of the ten tribes.

Is'raelite. See JEW.

Israels', Josef, 1824– ; Dutch genre painter; b. Groningen; studied at The Hague; medal of honor, Paris exposition, 1889; works, many of which are in galleries in the U. S., include "Alone in the World," "The Frugal Meal," "A Cottage Madonna," "The Children of the Sea."

Israfil (ĭz'rä-fēl), according to the Koran, the angel of music, who possessed the most melodious voice of all God's creatures. This is the angel who is to sound the resurrection trump, and will ravish the ears of the saints in paradise. Israfil, Gabriel, and Michael were the three angels that warned Abraham of Sodom's destruction.

Issyk-Kul (ĭs'sĕk-kōl), lake of central Asia; in the government of Semiriets Kensk, Russian Turkestan; on the N. side of the Thian Shan Mountains; 120 m. long by 35 broad; area, 2,200 sq. m.; is about 5,000 ft. above sea level; waters brackish and full of fish; lake said never to freeze over; ruins are known to exist beneath the present surface.

Is'sue, in the law of pleading, the point which arises when a material proposition of fact or a conclusion of law is directly affirmed by one party to the suit and controverted by the other; the point in dispute which is presented for decision to the court or jury. Issues as to their subject-matter are of two kinds—issues of *law* and issues of *fact*. An issue of law arises on demurrer, and presents a question of law, which is adjudicated by the court sitting without a jury; an issue of fact arises on a traverse or answer to the allegations of the opposite party, and presents a question of fact, which in a common-law action is determined by a jury and in an equity case by a judge.

Is'sus, ancient city of Cilicia; near the mouth of the river of the same name; at the head of the Gulf of Iscanderoon or Alexandretta. In Xenophon's time it was great and prosperous. Here Alexander, 333 B.C., gained a great victory over Darius, whose family was captured. Here, too, the Bryzantine emperor Heraclius, 610–641, defeated a large Persian force. It is probable that its site is covered by the sea.

Issy (ēs-sē'), village of France, department of Seine, adjoining Paris. Here Blücher defeated Davout, 1815, and the Germans destroyed its fort during their siege of Paris, 1871; fortification reconstructed as a part of the defenses of Paris. Pop. (1901) 13,404.

Is'tar, in early Babylonian legend, the god of war and destruction.

Is'ter, ancient name of the Danube.

Isthmian (ĭs'mĭ-ăn) **Canal.** See PANAMA CANAL.

Isthmian Games, national Greek biennial festival of athletic exercises and horse races, under the direction of the Corinthians, on the Isthmus of Corinth. This accessible location, and the wealth and attractiveness of Corinth itself, undoubtedly had much to do with the great popularity and importance of the Isthmian games from early to late antiquity. The site, at some distance from Corinth, has become very easy of access by the completion of the Peloponnesian Railway (Station Isthmia, 50 m. from Athens), and more recently, 1893, of the Corinth Canal. For an accurate account of extant remains of the Temple of Poseidon (Neptune), the marble stadium, a Roman theater, the wall and gates of the pentagonal precinct, and of the celebrated Isthmian wall which skirts it, see Baedecker's "Greece," and Curtius' "Peloponnesos." The fullest account of its antique splendor is that in Pausanias's "Description of Greece."

Isth'mus of Panama'. See PANAMA, ISTHMUS OF.

Is'tria, county of the Austrian province of the coast districts (Küstenland). It consists of a mountainous peninsula projecting into the NE. part of the Adriatic, and is bounded by the territory of the city of Trieste and the county of Görg. Pop. (1908) 335,664. Capital, Pissino.

Itacolumite (ĭt-ā-kōl'ū-mīt). See FLEXIBLE SANDSTONE.

Ital'ian Ar'chitecture. See RENAISSANCE.

Italian Paste. See MACARONI.

It'aly, kingdom of S. Europe, comprising the boot-shaped peninsula of the same name, together with Sicily, Sardinia, and several smaller islands; bounded on the N. by a line considerably to the S. of the central Alps, which separate it from Switzerland and Austrian Tyrol; E. by the E. Alps and the Adriatic Sea; S. by the Ionian Sea; W. by the Tyrrhene and Ligurian seas, and the W. Alps; area, 110,550 sq. m.; pop., in round numbers (1908), 33,910,000; capital, Rome. Italy is divided into 69 provinces, of which 60 are subdivided into territories, and 9 (the province of Mantua and the 8 provinces of Venetia) into districts; number of territories 197, of districts 87; territories and districts divided into 8,303 communes, and, in Sardinia, 4 boroughs; dependencies, the little republic of San Marino, in Italy, the colony of Eritrea, and Italian Somaliland, in Africa, and a few islands; area of possessions in Africa, 188,500 sq. m.; pop., 850,000.

The principal harbors are: On the W., Genoa, Spezia, Leghorn, Cività Vecchia, Gaëta, Naples, and Reggio; on the S., Taranto; on the E., Brindisi, Bari, Ancona, Rimini, Chioggia, and Venice. The most important islands along the coast are Elba, Ischia, and Capri on the W. The great mountain systems are the Alps and the Apennines, including the Sub-Apennine ranges. Italy has but two rivers of importance, the Po and the Adige, the former flowing E., across upper Italy, the latter, SE. through Venetia, both falling into the Adriatic. Nearly all the others are mere mountain torrents. Nine principal canals, chiefly for irrigation, were constructed during the Middle Ages in Lombardy and Venetia. The finest of these, the Naviglio Grande or Ticinello, between the Ticino and Milan, is 28 m. long and navigable for large vessels. Piedmont is intersected by about 250 canals. The largest lakes belong to upper Italy—Lago Maggiore, the lake of Lugano, the lake of Como, Lake Iseo, and Lake Garda. The climate of the Lombard plain, of the mountain heights, and of the Adriatic shores is in winter not unlike that of central Europe; while that of S. Italy and Sicily has many points of resemblance with the climate of N. Africa.

Among the mineral products are many famous marbles, including the statuary of Carrara, the sea green of Bocchetta, the gold veined of Porto Venero, the jasper of Barga, the green of Tuscany, the black of Pistoia, the lapis-lazuli and the yellow of Siena. Alabaster is abundant in Tuscany. There is no good coal; lignite, however, is found. The iron of Elba is of the highest quality; lead is found in Sardinia and copper in Tuscany, and there are small veins of other metals. The chief cereals are wheat, maize, rye, barley, oats, rice. To these may be added chestnuts, also potatoes and other vegetables. The vine is cultivated everywhere. The olive comes next in importance. Oranges, lemons, and figs are extensively cultivated and exported. The cultivation of the mulberry tree for the purpose of silk culture is considerable. Hemp, cotton, and tobacco are also grown. Cheese is extensively made and exported. Large numbers of cattle, sheep, goats, and swine are raised.

Silk spinning is the leading manufacturing industry, and in this branch Italy is second to China alone. Cotton is the next important industry, the goods produced being chiefly of the coarser descriptions. The woolen industry is pursued in nearly the whole of Italy. Jute, flax, hemp, and linen are also largely manufactured. In the quantity of wine produced Italy is second only to France, and next to it is raw silk. Olive oil, sulphur, and macaroni are the most characteristic products. There is a large manufacture of the simpler kinds of machinery, but much of the more complex work is imported. Of much interest to the lover of art are the glass and mosaic industries of Venice, the ceramic wares of Ginori at Florence, and those of Faenza; the mosaic work of Florence and that of Rome, and the various products of the jeweler's art. The coral, sponge, and other fisheries are of great importance; the trade in straw hats is large. The chief objects imported (1907) were cotton, coal, machinery, wheat, iron and steel, raw silk, and timber; the main objects of export were silk, olive oil, fruits, and wine. Value of special imports, excluding gold, coined silver, and goods in transit (1907), $555,969,000; exports, $376,132,000; principal ports, Genoa, Leghorn, Naples, Messina, Catania, Palermo, Venice, and Brindisi.

The religion of practically the entire nation is the Roman Catholic. The Albanians in the S. follow the Greek rites. There is entire religious freedom. The monasteries, once very numerous and wealthy, have been suppressed and their property has been taken by the state. By decrees and statutes of 1870 and 1871, the supreme pontiff is declared to be an independent sovereign prince, his person is sacred, and his residences inviolable, the latter consisting of the Vatican and Lateran palaces and the villa of Castel Gandolfo. The law of guarantees also assigned to the pope a yearly income of 3,225,000 lire ($645,000), which, however, neither Pius IX nor Leo XIII would accept. There are 50 archbishoprics and 216 bishoprics, besides 6 cardinal bishops. Higher education is provided for by high institutes and schools and by the 21 state and free universities. The most numerously attended universities are those of Naples, Turin, Rome, Bologna, Palermo, Padua, and Pavia. The great public libraries are those of Turin, Milan, Naples, and Florence. There are 34 schools of agriculture; 2 schools of mining, 308 industrial and commercial schools, 174 schools of design and molding, 26 fine art institutes, 56 institutes and conservatories of music.

The Italians are sober, industrious, and thrifty, but of a passionate nature, and the number of homicides per 100,000 of the population is nearly twenty times as great as in England. Crimes of violence are also prevalent, especially in the S., and notably in Sicily. Capital punishment has been abolished. The Italian language was originally the Tuscan dialect, used by Dante and other great writers of the fourteenth century. It is only in Tuscany and parts of the adjacent provinces that this is the household speech of even the educated classes, but persons of even moderate culture

are able everywhere to use Tuscan freely. The emigration is considerable, and amounted, 1907, to 700,467, of which about half is described as temporary, but many of those thus classified do not return. There were altogether about 3,345,000 Italians in foreign countries (1901), chiefly in the U. S. and Brazil. Emigration to the U. S. rose from 87,714 in 1900 to 298,124 in 1907. Cities having over 149,000 pop. (1901), Naples, Milan, Rome, Turin, Palermo, Genoa, Florence, Bologna, Venice, Messina, Catania.

The form of government is that of a constitutional monarchy, hereditary in the male line, and is based on the Sardinian Constitution of 1848. The Parliament, which is quinqennial, consists of two chambers: (1) the Senate, of unlimited numbers, formed of life members nominated by the king, at least forty years of age, which consisted, 1908, of 318, exclusive of five members of the royal family; (2) the Chamber of Deputies, 508 in number, of thirty years of age or over. Money bills must originate in the Chamber. The franchise is extended to all males over twenty-one years of age who can read and write and who pay direct taxes to the amount of 20 lire annually or at least 500 lire of rent. The prefects or governors of provinces are government appointees. Otherwise the elective system prevails generally, and local government is in the hands of provincial, municipal, and communal councils. There is complete freedom of the press.

The army, modeled on that of Germany, consists of a first line or permanent army, a "mobile militia," answering to the German *Landwehr*, and a "territorial" militia, answering to the *Landsturm*. Service in the army (or navy) is compulsory and universal. The total period is nineteen years, beginning at the age of twenty; service in the permanent army is for eight or nine years. The peace strength of the army (1907) was 254,588 officers and men, exclusive of 30,235 carabinieri (military police). The strength of the field army is about 400,000; of the mobile militia, 200,000; of the territorial militia, 2,222,631. The naval personnel consists of 1,898 officers and 26,000 men. There were (1909) 270 vessels, built and building or projected, including ten modern battleships and six old ones.

Among the earliest inhabitants of Italy were the Etruscans or Tuscans, Umbrians, Oscans, Siculi, Latins, Volsci, Æqui, Sabines, besides various Grecian colonies in the S. part or Magna Græcia. The name Italy received in the time of Augustus its full extension, embracing the provinces of Liguria, Gallia Cisalpina, Venetia, and Istria, in the N.; Etruria, Umbria, Picenum, Samnium, Latium, and Campania, in the center or Italy proper; and Apulia, Calabria, Lucania, and Bruttium, in the S. or Magna Græcia. The early history of the country is in its main parts identical with that of Rome (*q.v.*). Odoacer, a leader of the Heruli and other tribes, having dethroned the last W. Roman emperor, Romulus Augustulus (476 A.D.), assumed the title of King of Italy; but, 493, succumbed to Theodoric the Great, king of the Ostrogoths, and for a time the entire peninsula was united under Gothic dominion.

Succeeding events and incidents of importance include the invasion of the Lombards, 568, and establishment of their powerful kingdom; conquest of territories in central Italy by Pepin, king of the Franks (eighth century), and cession of same to the pope; subjection and annexation of Lombard kingdom by Charlemagne, 774; N. Italy ruled by Carlovingians until 887; conquest of N. Italy by Otho I, of Germany, crowned King of Italy, 961, and emperor, 962; and rise in the Lombard territory of prosperous municipalities, which formed a league, and, allying themselves with the papal power, opposed the efforts of the German (Hohenstaufen) dynasty to erect Italy into an independent kingdom. Then came the rise of the national party subsequently known as Guelphs, while the partisans of the emperor were known as Ghibellines; struggle between the popes and the emperors in the eleventh, twelfth, and thirteenth centuries; defeat of Frederick Barbarossa by the Lombard League of cities, 1176; overthrow of the German dynasty in upper Italy, 1254, and wresting from it of the Kingdom of the Two Sicilies, obtained by Frederick Barbarossa by the marriage of his son; long series of struggles in the thirteenth century by the Guelphs and Ghibellines, the former gaining the victory in Genoa, Florence, and other republics, but finally suffering division into hostile factions, and in several states succumbing to petty tyrants; loss of Sicily to Charles of Anjou by a popular outbreak ("Sicilian vespers"), 1282, and consolidation of his kingdom at Naples.

During the fourteenth and fifteenth centuries six states rose to predominance: Naples, the papal states, Florence under the Medici, Milan under the Visconti and Sforza dynasties, Venice, and Genoa. Desolating wars between the rival French and Austrian dynasties began about the opening of the sixteenth century and ended with the defeat of the French at Pavia, 1525. Milan and Naples were secured to Spain under Charles V; Piedmont was obtained by the ducal house of Savoy. The conquest of Milan, Mantua, and Montferrat was made by Austria, 1706–7; Sardinia and Naples were obtained by Austria by the Peace of Utrecht, 1713, but the former was exchanged for Sicily, which had been given to Piedmont. Parma and Piacenza, which had fallen to Austria, 1738, were conquered by the Spanish prince Philip, ruler of Naples, and conferred on him as an hereditary duchy by the Treaty of Aix-la-Chapelle, 1748. Next are to be noted the annexation of Savoy to France, 1796; surrender of Venice to Austria by Bonaparte, 1797, and erection by him of Milan, Mantua, a portion of Parma, and Modena into the Cisalpine Republic, transformation of Genoa into the Ligurian Republic, and of the papal states into the Roman Republic, 1798. Then followed the expulsion of Ferdinand IV, of Naples, and formation of his kingdom into the Parthenopean Republic, 1799. Tuscany was given to the Duke of Parma by the Peace of Lunéville, and designated the Kingdom of Etruria, while Parma fell to France; the Cisalpine Republic was

changed into the Italian Republic, 1802, under the presidency of Bonaparte, and into the Kingdom of Italy under Eugène Beauharnais, 1805; Venice, Istria, and Dalmatia were added to the Italian kingdom by the Peace of Presburg, 1805; Cuastallia, the Ligurian Republic, Parma, and Piacenza were annexed to France, 1806, while Naples was once more made a kingdom for Joseph Bonaparte, who was succeeded by Murat, 1808.

The Etrurian kingdom and the papal states were added to France. Istria and Dalmatia were separated from Italy and united to the new Illyrian kingdom, and a portion of Tyrol was added to Italy, 1808. The French were expelled from Italy by Austria and by Murat from Naples, 1814. Among results of the Congress of Vienna, 1815, were the reinstatement of the King of Sardinia, the cession of Venetia and Lombardy to Austria, and the restoration of the papal states and the Kingdom of the Two Sicilies to their former rulers. Outbreaks against foreign rule, 1820, 1821, 1831, 1832, and a revolution under Charles Albert, of Sardinia, 1848–49, were suppressed by Austria. France and Sardinia formed an alliance against Austria, and defeated the latter at Magenta and Solferino, 1859. Lombardy, exclusive of the fortresses of Mantua and Peschiera, was ceded to Sardinia; Venetia was confirmed to Austria; Savoy and Nice were ceded to France by Sardinia; Tuscany, Parma, Modena, and Romagna were annexed to Italy, 1860. Subsequent events include the overrunning of the Two Sicilies by Garibaldi and his volunteers, 1860; surrender of Naples to the patriot forces, 1861; meeting of the first Italian Parliament at Turin, 1861; Victor Emmanuel decreed King of Italy, 1861; attempt of Garibaldi to free Rome from the French, 1862; war of Italy and Prussia against Austria, 1866; cession of Venetia to Italy; another attempt by Garibaldi to free Rome, 1867; withdrawal of French troops from Italy at the beginning of the Franco-German War, 1870; occupation of Rome by government troops, and that city declared the capital of the new kingdom of Italy, 1870; entry of Victor Emmanuel into Rome, 1871; formation of the Triple Alliance by Italy, Germany, and Austria-Hungary, 1883; the assassination of King Humbert I, 1900, and the accession of his son, Victor Emmanuel III.

Itard (ē-tär'), **Jean Marie Gaspard, 1775–1838**; French physician; b. Oraison; after service as surgeon in the Revolution, was appointed physician to the Deaf Mutes' Institution, Paris, 1799, where he made a specialty of diseases affecting the organs of hearing. His experiments in the education of "the wild man of Aveyron," a boy captured in the woods, were described by him in two works published, 1807, which excited great interest. Itard wrote an important work on "Diseases of the Ear and the Organs of Hearing."

Itas'ca Lake, body of water in Beltrami and Cass Cos., Minn.; long popularly regarded as the source of the Mississippi River; elevation, 1,575 ft.; is surrounded by pine-clad hills some 100 ft. higher than the lake. The Mississippi River leaves the lake with a breadth of some 12 ft., and is ordinarily less than 2 ft. deep at this point. The lake is not the actual source of the river, as it receives several streams of small size, and on these streams lie ponds or small lakes.

Itatiaia (ē-tä-tē-ī'yä), highest mountain of Brazil; in the Mantiqueira subchain of the Coast Range, at the angle where the states of Rio de Janeiro, São Paulo, and Minas Geraes meet; altitude, according to Glaziou, 8,898 ft. Snow sometimes lies on the summit for several days. The Paraná takes its rise on the N. and W. sides of Itatiaia.

Itch. See SCABIES.

Ith'aca, or Thea'ki, one of the smallest of the Ionian islands; area, 37 sq. m.; is mountainous but fertile, producing olive oil, wine, and currants of a superior kind. Ithaca is famous as the dominion and home of Ulysses, and contains some cyclopean ruins, which still are called the Castle of Ulysses. The principal town is Vathi, with a good harbor.

Ithaca, capital of Tompkins Co., N. Y.; at the head of Cayuga Lake, 142 m. W. by S. of Albany. It is in an agricultural region; manufactures flour, calendar clocks, spokes and hubs, horse rakes, paper, glass, leather, musical instruments, firearms, typewriters, and machinery, and receives by railway and ships by canal a large quantity of coal from the Pennsylvania anthracite region. The city is situated in a region of much beauty, having numerous waterfalls and cascades and picturesque gorges. It is the seat of Cornell Univ. Pop. (1905) 14,615.

Ith'amar, fourth son of Aaron, consecrated to the priesthood; his posterity took charge of the tabernacle in the wilderness; Eli, Ahitub, Abiah, Abimeleck, and Abiathar, of his line, became high priests, which office reverted to the family of Eleazar under Solomon.

Itinera'rium, Latin word generally applied to descriptions of the ancient Roman roads and routes of traffic. A number of such descriptions have come down to us, and they may be divided into two classes, *itineraria scripta*, which have the common character of books, and *itineraria picta*, which are graphic representations in the form of charts.

Itius (Ish'ī-ŭs) **Pŏr'tus**, port on the French coast, nearly opposite Dover, from which Cæsar sailed on his second expedition to Britain. Its position has been a matter of much controversy; the majority of geographers, however, identify it with Wissant.

Ito (ē'tō), **Hirobumi** (Prince), **1840–1909**; Japanese statesman; b. province of Choshu; came of the soldier class; made a secret visit to Europe, and later an open visit to the U. S., which led him to become the leading spirit in Westernizing his native land; took a prominent part in establishing the mint at Osaka, and was the recognized exponent, as well as the father, of the constitution promulgated 1889. After holding the office of Minister of Public

Works he was transferred to the Home Office, 1878; visited foreign countries, 1879–80, and returned with strong German proclivities; was made a marquis, 1885; became Minister President of State, 1886, and introduced sweeping economical reforms; retired, 1888; again in office, 1892–95; by his ability in carrying his country successfully through the Chinese War, earned the title of the "Bismarck of Japan"; again Premier, 1900–01; president of the Privy Council, 1903; chief of the Elder Statesmen during the Russo-Japanese War; became Japanese Resident General in Korea, and was created a prince, 1906; assassinated by a Korean, at Harbin, Manchuria, October 26, 1909.

Itú (ē-tô′), city of the State of São Paulo, Brazil, on the Tieté, near the great fall of that river; 48 m. WNW. of São Paulo city; is one of the most flourishing towns of the state; has a cotton factory and some foundries. Pop. abt. 11,000.

Ituræ′a, small district in the NE. of Palestine, which, together with Trachonitis, in the time of Christ formed the tetrarchy or government of Philip, son of Herod the Great and brother of Herod, Tetrarch of Galilee. It was S. of the river Pharpar, NW. of Bashan, and adjoined Auranitis, the modern Hauran. It is now called Jedur, and contains thirty-eight towns and villages.

Iturbide (ē-tôr-bē′thā), **Agustin de,** 1783–1824; Emperor of Mexico; b. Valladolid (now Morelia); took a distinguished part as an officer of the Spanish army against the Mexican revolutionists of 1810 and subsequent years; rose to the rank of colonel; in 1821, promulgated the "Plan of Iguala," to make Mexico an independent monarchy under a prince of the Spanish Bourbon dynasty, but this was not acceptable to the Spanish Govt.; supported by the army, assumed the title of emperor, May 18, 1822, and was crowned, July 21st; was forced to abdicate in April, 1823, Santa Anna having proclaimed the republic in Vera Cruz; lived in Italy and England on a pension; returned, 1824, ostensibly to aid in repelling an anticipated Spanish invasion, but, doubtless, with the expectation of recovering the throne; was declared an outlaw, and by order of the state legislature was shot at Padilla, Tamaulipas. His sons held office under the Mexican Govt. His grandson, Agustin, was recognized by Maximilian as heir presumptive.

Itys (ī′tĭs), in Greek mythology, son of Procne and Tereus. Tereus having wronged Philomela, sister of Procne, the women slew Itys, and served him roasted as a dish for his father. When Tereus was about to slay the fleeing sisters, the gods, in answer to the prayer of the women, changed Tereus into a hoopoe, or hawk, Philomela into a swallow, and Procne into a nightingale.

Ivano′vo-Voznesenk′, city of Vladimir province, central Russia; on an affluent of the Volga; is a center for the manufacture of cottons, and is called the Manchester of Russia. Pop. (1900) 64,628.

Ivan (ē-vän′), or **John the Great,** 1440–1505; third Grand Duke of Russia; ascended the throne, 1462; liberated his people from the domination of the Golden Horde; reconquered W. Russia, and consolidated the Russian state; generally sought to gain his ends by negotiation rather than bloodshed.

Ivan the Ter′rible, 1529–84; fourth Grand Duke of Russia and the first czar of that country (though reckoned as Ivan IV); succeeded his father Basil, 1533; put to death, 1543, the triumvirate of regents, and when he was crowned, 1547, assumed the title of czar; carried on wars with the Tartars, capturing Astrakhan, Kasan, and parts of Siberia; carried on long and indecisive wars with Poland and Sweden; introduced civilization and the art of printing in Russia, but ruled with great cruelty and harshness.

I′vory, James, 1765–1842; Scottish mathematician; b. Dundee; many years superintended a flax-spinning factory, and, 1804, was appointed Prof. of Mathematics in the Royal Military College at Marlow (now at Sandhurst); was a self-taught mathematician, and spent much of his time in retirement, studying the writings of the most learned continental mathematicians, and adding to their value by original contributions.

Ivory, bony substance which composes the tusk of the elephant, and is a peculiar modification of dentine. In commerce it is customary to include in the term the tusks of the hippopotamus, the walrus, the narwhal, and some other animals; but, according to high authorities, it can only be strictly applied to the elephant's tusk. The appearance given by a cross section of any portion of an elephant's tusk, of circular lines intersecting each other so as to form lozenge-shaped figures with curved boundaries, distinguishes true ivory from all other bony substances, and from all other tooth substances, whether dentine or not. The principal supplies of ivory are derived from the W. and E. coasts of Africa, Cape Colony, Ceylon, India, and the countries of the Straits of Malacca. The best comes from Africa, and is of a finer texture and less liable to turn yellow than that brought from India.

A remarkable source of ivory, which has long supplied the Russian markets, is the tusks of fossil mammoths found in the banks of the rivers of N. Siberia. This fossil ivory is of similar quality to that of living animals, and some of the tusks are of immense size. The uses of ivory are numerous. It is exquisitely smooth in working, and is in all respects the most suitable material for ornamental turning, as it is capable of receiving the most delicate lines and cutting. Napkin rings, billiard balls, card cases, buttons, spoons, saddlery rings, and many other articles have been made from it; but within recent years its scarceness and high price have led to the substitution of vegetable ivory, bone of different kinds, celluloid, and vulcanized rubber for the genuine article.

Egyptian carved utensils and boxes exist in the museums, some as early as the fifth

dynasty. Assyrian carvings were found at Nineveh. The Greeks are known to have used it in connection with gigantic works of sculpture. Under the Roman dominion ivory became common in all the Mediterranean lands, and was used for many decorative and ceremonial purposes, of which the most important to modern students has been its use for diptychs. The separate leaves of these diptychs were used afterwards for book covers and the like, and tablets carved for the purpose took their place on the splendid manuscripts of the Byzantines in the tenth century and later. Throughout the Middle Ages caskets, holy-water vessels, mirror cases, religious triptychs and statuettes, and the heads of crozier and pastoral staves were exquisitely carved in ivory, and the museums of Europe are as rich in these as they are poor in the ivories of antiquity. In the sixteenth century beautiful powder horns for fine priming powder were made of ivory, and it was used for inlaying the stocks of arquebuses and the handles of halberts, and cabinets of great size and elaboration of parts, as well as in the mediæval ways. About that time a school of ivory carvers grew up in Dieppe, Normandy, and this specialty of the place has never been lost.

Vegetable ivory, so called from its resemblance to ivory, is the hardened kernel of the corozonut, the fruit of the *Phytelephas macrocarpa*, a S. American tree. See PHYTELPHAS.

Ivory Black. See BONE-BLACK.

Ivory Coast, part of the N. coast of the Gulf of Guinea, W. Africa, between the so-called Grain Coast and Gold Coast; extends from Cape Palmas E. to the Assinie River, and has several towns along the coast which traffic in ivory, gold dust, and palm oil. Most of this coast is under French protection.

Ivrea (ē-vrā'ä), town in province of Turin, Italy; at the mouth of the valley of Aosta, on the Dora Baltea; 38 m. NNE. of Turin; was a Roman possession as early as 90 B.C., and has many vestiges of that period; played an important part in the mediæval history of N. Italy. Pop. of commune (1901) 11,528.

Ivry-la-Bataille (ēv-rē'-lä-bä-tāy'), village of France, 40 m. W. of Paris, on the river Eure; noted for the decisive victory gained here by Henry IV of Navarre, March 14, 1590, against the forces of the league under the Duke of Mayenne.

I'vy, popular name of several plants, especially those of the genus *Hedera*, family *Araliaceæ*. The *H. helix*, a climbing, shrubby Old World plant, is sparingly cultivated in the U. S., where it nowhere thrives as in Europe, being impatient of the cold of winter and the dryness and heat of summer. It abounds in Europe, growing on houses, churches, walls, castles, and trees. There are many varieties. The so called German ivy, common in house culture, is not an ivy at all, but a Senecio from S. Africa. Various clinging vines are called ivies. In the U. S. the commonest so-called ivy is the Boston ivy, *Ampelopsis tricuspidata*, better known as *A. Vietchii*. This is native to Japan. A related native plant, the Virginia

VARIEGATED-LEAF IVIES.

creeper, *A. quinquefolia*, is sometimes called ivy. For the poison ivy of the U. S., see RHUS.

Iwakura Tomomi (ē-wä-kō'rä tō-mō'mē), d. 1883; Japanese statesman; was a member of the kuge, or noble, class; attached himself at an early age to the person and fortunes of the mikado, and was prominent in organizing the party of the mikado; was appointed Vice Prime Minister, 1871, and held the office till within a short time of his death; opposed the schemes of aggrandizement in Korea and Formosa, which attracted the younger school of politicians, and was accounted the chief of the peace party; headed the unsuccessful mission sent to Europe for the purpose of revising the treaties with foreign powers.

Ixi'on, in Greek mythology, King of the Lapithar; father of Pirithous, and of the Centaurs by a phantom substituted by Zeus for Hera, whom Ixion had attempted to seduce. Ultimately he was condemned to be chained to a wheel perpetually revolving.

Ixtaccihuatl (ēs-täk-sē-hwät'l), mountain of the Mexican plateau, on the confines of the states of Mexico and Puebla; about 40 m. SSE. of Mexico city; altitude, 16,077 ft. The upper portion is covered with perpetual snow.

Ixtahuacan (ēs-tä-wä-kän'), or San'ta Catarina (kä-tä-rē'nä), town in the department of Sololá, Guatelmala, about 10 m. W. of Sololá city; population abt. 10,000, mainly Indians. There are several smaller towns of the same name in Guatemala.

Iyeyasu (ē-yä'yäs), Tokugawa, 1542–1616; Japanese military officer, statesman, and ruler; b. Okasaki; rose from the ranks of the military; in the battle of Sekigahara, 1600, defeated the forces of two parties striving for supremacy in Japan; made Yedo the center of his rule; pacified Japan; adopted in his foreign relations that isolating policy which made that country a hermit nation; founded the magnificent dynasty of the Tokugawas which ruled till 1868, always, however, acknowledging fealty to the ancient imperial house at Kioto; was buried at Nikko; and was deified under the posthumous title of Gongen-Sama; wrote an interesting historical document, the "Testament," or "Legacy of Iyeyasu."

Izabal (ē-thä-bäl'), **Lake,** or **Gol'fo Dulce** (dōl'sā), lake of Guatemala in department of same name; main portion about 25 m. long by 10 wide; at its NE. end it narrows to a sinuous channel, which again widens to a smaller lake called the Golfete; the latter communicates by a second narrow channel with the Gulf of Honduras. The Potochie River enters the W. end of the lake, which may be regarded as its estuary.

Izabel de Bragança (ē-zä-bĕl' dē brä-gän'sä), 1846– ; Brazilian princess; b. Rio de Janeiro; eldest daughter of Dom Pedro II, Emperor of Brazil; married, 1864, to Louis Gaston d'Orléans, Count d'Eu. While her father was absent in Europe (1871) and the U. S. (1876), she acted as regent, and during the latter period signed the act which freed all slaves in Brazil unconditionally. After the establishment of the republic she resided in Europe.

Izalco (ē-thäl'kō), volcano in the W. part of San Salvador, Central America. The cone is now over 5,000 ft. high, and owing to the constant flames at its summit it has been called the Lighthouse of San Salvador. It is one of the most curious volcanoes, and, except Jorullo in Mexico, the only one in the world that has risen from the level of the plain within the memory of man. Its formation began in 1798, after a series of destructive earthquakes.

Izcoatl (ēs-kō-ät"l), d. 1436; fourth war chief or so-called emperor of ancient Mexico, and by his superior military and political talents substantially the founder of the Aztecan Empire. A natural brother of his predecessor, he reigned, 1427–36; conquered many neighboring states, and embellished and fortified the capital. He also framed a constitution that materially improved the political system.

Izdubar', mythical or semimythical king and hero of the earliest Babylonian annals. The legends represent Izdubar as a giant residing in the country of Accad, as a subduer of great animals immediately after the Deluge, and as a mighty conqueror who became a king and ruled in Erech or Uruk, the earliest capital of Babylonia. Apparently he was deified after his death.

J

J, tenth letter of most European alphabets, is a spurious counterpart of the letter I. It is also called the consonant of that vowel, when it precedes another vowel, in languages where it sounds like *y* in *yet*, as in Italian and Hungarian, and in German, Danish, Polish, and other Teutonic and Slavic languages. Its sound in French and Portuguese is rendered by the combination *zh* in English. The English sound of J represents the preceding intimately combined with that of *d*, equivalent to *dzh*. In Spanish J is sounded like the German *ch*, as in *jóven*, young. In modern Italian J is seldom used.

Jaafar (jä'ä-fär), d. 802; one of the BARMECIDES, grandson of the Vizier Khaled, son of the Vizier Yahya, and himself a favorite of the Caliph Haroun-al-Raschid, who gave him his sister Abbasa in marriage, on condition that the connection should be merely nominal. Abbasa having borne a son to Jaafar, the caliph put both him and his father to death. It is probable that this account is derived rather from poetry than authentic history.

AFRICAN JABIRU.

Jabalpur (jä-bäl'pōr), city of the district of Jabalpur, central provinces, British India; 165 m. NE. of Nagpur and 1,458 ft. above sea level; is in a rocky basin, the gorges of which have been converted into artificial lakes; manufactures carpets and cotton goods. Pop. (1901) 90,316.

Jabiru (jäb'ī-rō), name of several birds of the stork family, and of the genus *Mycteria* and allied genera, found in Australia, Africa, and S. America. The species are few. *M. australis* is the best known. These birds, unlike true storks, have the bill upturned, and one species found in S. America has the head and neck bare; those of the Old World have these parts clothed with feathers.

JABLOCHKOFF CANDLE.

Jablochkoff (yä-blōkh-ōf') **Can'dle,** one of the earliest forms of the commercial electric arc light; was an arc lamp entirely without regulating mechanism, and intended for use on an alternating-current circuit. It consisted simply of two slender rods of hard graphitic carbon mounted side by side, with an intervening layer of kaolin, which acted as an insulator and also added to the incandescent surface when the candle was in operation. This source of light was invented by Paul Jablochkoff, a Russian telegraph engineer (1847–94); perfected under the auspices of a French company, 1878, and was used in that year in Paris.

Jablonski (yä-blōn'skē), **Daniel Ernst,** 1660–1741; German prelate and Orientalist; b. near Dantzic; became pastor of the Reformed Church at Magdeburg, 1683; rector of the

College of the Moravian Church at Lissa, 1686, and was famous as a pulpit orator; was court preacher—first at Königsberg, 1691, and afterwards at Berlin, 1693; became a bishop among the Moravians, 1699, and their actual head; elected president of the Royal Academy of Sciences at Berlin, 1733.

Jablonski, Paul Ernst, 1693–1757; German Orientalist; b. Berlin; son of the preceding; was Prof. of Theology and chief minister of the Calvinistic Church at Frankfort on the Oder; published numerous works on Oriental philology, history, divinity, and antiquities; the most important is his "Pantheon Ægyptiorum."

Jablonský, Boleslav (pseud. for KAREL EUGEN TUPY), 1813–81; Bohemian poet; b. Khardasova Recice; entered a convent, 1838, and, 1841, took holy orders. His being a priest did not prevent him, however, from writing fiery songs of love, which became very popular and won him the title of "Love Singer." In 1847 he was appointed provost of the Premonstratensian Monastery at Zverinec, near Cracow, Poland, where he died. His foremost works are the "Love Songs," "The Father's Wisdom," a collection of didactic poems, and "Three Eras of Bohemia," a patriotic poem.

Jabneel (jāb'nē-ĕl), town of Palestine, 12 m. S. of Jaffa and 3 m. from the Mediterranean. Generally held by the Philistines in Old Testament times, it played an important part in the wars of the Maccabees. After the destruction of Jerusalem, Jabneel was (70–135) the seat of the Sanhedrim.

Jacamar (jăk'ä-mär), popular name of various small birds belonging to the American family *Galbulidæ*, related to the barbets, tou-

JACAMAR.

cans, and bee eaters. They have two toes in front, two behind, long, slender, sharp-pointed bills, and the plumage of the upper parts generally of a bronzed metallic green, much like that of the humming birds.

Jacana (jăk'ä-nä), name given to the members of the family *Jacanidæ*, a group of small birds resembling rails, but more nearly related to the plovers. They are distinguished by their very long, slender toes, by means of which they are enabled to walk over the

CHESTNUT JACANA.

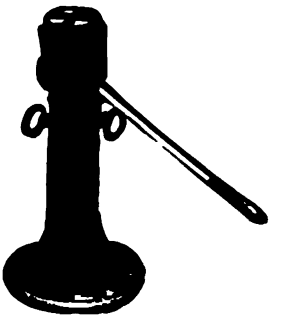
leaves of water lilies and other aquatic plants. This bird is found as far N. as Texas. Related species occur in Africa, Asia, and Australia.

Jacaré (jăk'ä-rā), popular name of several S. American crocodilians, nearly related to the alligator. In a scientific sense jacaré is used as the name of a genus of caymans.

Jachmann (yäkh'män), **Eduard Karl Emanuel,** 1822–87; German naval officer; b. Danzig; became director of the Prussian Admiralty, 1857; defeated the Danes at Jasmund, island of Rügen, 1864; became chief of the naval department, 1867; during the Franco-German War was commander in chief of the Baltic fleet, and on December 31, 1871, was made chief of the imperial navy.

Ja'cinth. See ZIRCON.

Jack, apparatus for raising heavy bodies and for moving machinery. The moving parts



ORDINARY HYDRAULIC JACK.

consist sometimes of a simple screw moving within a nut fixed in the shell of the instru-

ment, and turned by a long handle or a system of gearing; sometimes of a hydraulic press of compact form, small size, and high power, and occasionally of combinations of levers or gearing. The first of these forms of the tool is variously called a jackscrew

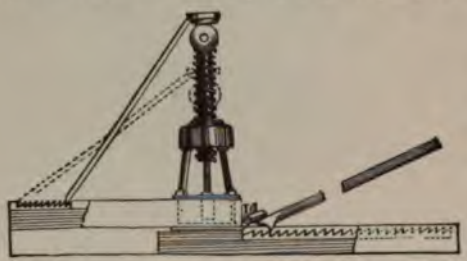


FIG. 2.—SIDE VIEW OF TRAVERSING SCREW JACK.

or a screw jack; the second is usually termed an hydraulic jack; the last mentioned is a geared jack. The screw jack or jackscrew is most commonly used for moderate weights, as a few hundred pounds, or perhaps a ton; the others are used up to 10 or 20 tons, or even more, but finally merge into the hydraulic press as they lose portability, which is an essential characteristic of the jack.

Jack'al, wild dog of Asia, SE. Europe, and Africa, the *Canis aureus*, a carrion-eater, and easily domesticated. It is nocturnal in its habits. Generally jackals hunt in packs, often

COMMON JACKAL.

numbering 200, and in such cases they are dangerous and attack much larger animals. Probably the jackal is one of the originals whence the domestic dog has sprung, as the two breed together.

Jack'ass, Laugh'ing. See DACELO.

Jack'daw, or **Daw,** diminutive member of the crow family, distinguished from its relatives by having a straighter bill. The forehead and upper parts of the body are black, the back of the head and nape gray, the under parts dark-slate color. The jackdaw breeds in church towers, ruins, holes in trees, or in seacoast rock crevices. It is found

JACKDAW.

throughout Europe and parts of Asia, and is readily tamed, and makes a most interesting pet. In the S. part of the U. S. the name is applied to the boat-tailed grackle.

Jack-o'-Lan'tern. See IGNIS FATUUS.

Jack-in-the-Pul'pit, also called INDIAN TURNIP, perennial herb of the arum family; derives its name from the fact that the upright spadix is inclosed by an overhanging spathe; common in the U. S. in damp, shady ground.

Jack Rab'bit, large rabbit (*Lepus callotis*) of the W. U. S., with very long ears, these appendages sometimes attaining a length of 6 in.

Jack'screw. See JACK.

Jack'son, Andrew, 1767–1845; American military officer and seventh President of the U. S.; b. Waxhaw Settlement, N. C.; son of Scotch-Irish immigrants; obtained but a limited education; entered the Revolutionary army at the age of thirteen, and was for a time a prisoner; after working in a saddler's shop and teaching school, studied law; was admitted to the bar, 1786; removed to Nashville, then in N. Carolina, 1788, and was solicitor or public prosecutor. He was a member of the convention which framed the constitution of the new State of Tennessee, 1796; represented Tennessee in Congress, 1796–97, and in the Senate, 1797–98; Judge of the Supreme Court of Tennessee, 1798–1804; elected major general of the state militia, 1801; and, withdrawing from politics, 1804, settled on a plantation called "The Hermitage," near Nashville, where he set up a cotton gin, formed a partnership, and traded to New Orleans, making the voyage on flatboats. He again took the field in the Creek War, 1813, and in conjunction with his former partner, Col. Coffee, inflicted on the Indians the defeats of Talladega, Emuckfaw, and Horseshoe Bend.

Appointed a major general of the army,

1814, he began a campaign against the British in Florida; conducted the siege of Mobile; seized Pensacola; won the famous battle of New Orleans, January 8, 1815; conducted the first war against the Seminoles, 1817, during which he seized on Pensacola, executed by court martial two British subjects, and escaped a trial for irregularity of conduct only through a division in Pres. Monroe's Cabinet. He was appointed governor of the new Territory of Florida, 1821; was elected to the U. S. Senate, 1823, and nominated by the Tennessee Legislature for the Presidency; received, 1824, the largest popular vote (155,872) among the four candidates, though John Quincy Adams was elected by the House of Representatives through the influence of Henry Clay.

After a campaign of unequaled bitterness, Jackson was elected President over Adams, 1828, receiving a popular vote of 647,231. Inaugurated, 1829, he at once removed from office nearly all the incumbents belonging to the opposite party, a procedure new to politics in the U. S. The chief events of his first term were the quarrels between Vice-President Calhoun and Secretary of State Van Buren, attended by a Cabinet crisis originating in scandals connected with the name of Mrs. Eaton (wife of the Secretary of War); the beginning of his war on the U. S. Bank, and his vigorous action against the partisans of Calhoun, who in S. Carolina, 1832, threatened to nullify the acts of Congress establishing a protective tariff. He was again a Presidential candidate, 1832, receiving 219 out of 288 electoral votes, his chief competitor being Henry Clay. He removed the government deposits from the U. S. Bank, 1833, thereby incurring a vote of censure from the Senate, which was, however, expunged four years later.

The other chief events of his second term were the removal of the Cherokees, Creeks, and Choctaws to the Indian Territory; extinguishment of the national debt; signing of useful commercial treaties with several foreign nations; admission of Arkansas and Michigan as states; renewal of the Seminole War, and the first great financial panic (1837) in the country. Having effected the election of Van Buren as his successor, he retired, 1837, to "The Hermitage" and there led a tranquil life until his death.

Jackson, Helen Maria Fiske Hunt, 1831–85; American author; b. Amherst, Mass.; daughter of Prof. Nathan W. Fiske; married Maj. Edward B. Hunt, U.S.A. (1822–63), and afterwards William S. Jackson; became deeply interested in the condition and treatment of the Indians; was appointed a special commissioner to investigate the condition of the Mission Indians in California; published "Verses by H. H.," "Bits of Travel," "Mercy Philbrick's Choice," "Hetty's Strange History," "A Century of Dishonor" and "Ramona," both pleas for better treatment of the Indians; "Glimpses of Three Coasts," etc. She has been considered the author of the mysterious "Saxe Holm" stories.

Jackson, Thomas, 1783–1873; English clergyman; b. Sancton, Yorkshire; entered the itinerant ministry of the Wesleyan Connection, 1804; was "connectional editor" of the Wesleyan Church, 1824–43, and tutor in the Richmond Theological Institution, 1843–61; works include "Library of Christian Biography" (12 vols.), "Life of Charles Wesley and Contemporary Events" (2 vols.), "Lives of Early Methodists" (3 vols.), and "Curiosities of Pulpit Literature."

Jackson, Thomas Jonathan, 1824–63; American military officer; b. Clarksburg, Va.; graduated at West Point, 1846; served in Mexico; and, 1852, became a professor in the Virginia Military Academy at Lexington. In 1861 he entered the Confederate service with the rank of major, devoting himself to the cause with religious fervor. He was soon made a brigadier general, and took a prominent part in the first battle of Bull Run (July 21st). Here his brigade was said to stand "like a stone wall," and its commander thenceforth was called "Stonewall Jackson." In the spring of 1862 Jackson was in command in the Shenandoah Valley, where he foiled greatly superior Union forces under Banks, Frémont, Shields, and McDowell. Having joined the army of Lee, he took a leading part in the battle of Cold Harbor (June 27th).

In the ensuing operations against Gen. John Pope, Jackson's corps was first sent to the N., and fought the indecisive action at Cedar Mountain (August 9th). Soon after, as major general, in command of nearly half of Lee's army, he made a rapid march and gained Pope's rear, whence resulted the second battle of Bull Run (August 29th, 30th). After capturing about 11,000 men at Harper's Ferry (September 15th), Jackson rejoined Lee, and participated in the battle of Antietam (September 17th). His corps was actively engaged at Fredericksburg (December 13th), and he was made lieutenant general. At Chancellorsville (May 2, 1863), at the head of nearly two thirds of the Confederate force, he surprised and turned Gen. Joseph Hooker's right. By mistake he was fired on by his own men while reconnoitering during a lull in the action, and fatally wounded.

Jackson, capital of Jackson Co., Mich.; 37 m. S. of Lansing; is in the central coal basin of the state, which overlies extensive but undeveloped deposits of salt. The Michigan State Prison and the main manufacturing and repair shops of the Michigan Central Railroad are here. The principal manufactures are carriages and wagons, corsets, foundry and machine-shop products, and carriage and wagon materials. Pop. (1904) 25,300.

Jackson, capital of the State of Mississippi and of Hinds Co.; on the Pearl River; 45 m. E. of Vicksburg; contains the State Capitol, State Penitentiary, State Institution for the Blind, State Institution for the Deaf and Dumb, State Lunatic Asylum, U. S. Govt. Building, Jackson Collegiate Academy, Millsaps College, Harris Business College, Belhaven Female College, Holmes Industrial Seminary for Colored Girls; is the geographical and railway center of the state; is in a rich cotton-growing region,

and has important manufactures and large trade interests. A large part of the city was destroyed during the Civil War. Pop. (1900) 7,816.

Jackson, capital of Madison Co., Tenn.; on the Forked Deer River; 72 m. ENE. of Memphis; contains the Southwestern Baptist Univ., West Tennessee College, and Memphis Conference Female Institute; has a large cotton trade, and railway machine shops, foundries, cotton-seed oil, flour, and woolen mills, engine and boiler works, and spoke, cotton gin, carriage, and ice factories. Pop. (1906) 17,193.

Jack'sonville, capital of Duval Co., Fla.; 15 m. W. of the Atlantic Ocean; 30 m. SW. of Fernandina; is the metropolis and center of business and travel of the state; popular winter resort for N. tourists and invalids; ships annually about 132,000,000 ft. of lumber, and large quantities of naval stores, cotton, fruits and vegetables, phosphates, and other commodities; contains Cookman Institute (M. E.), Florida Baptist Academy (both for colored students), separate high schools for white and colored pupils, and several hospitals and charitable institutions; was a point of embarkation of troops and supplies and a coaling station in the Spanish-American War, 1898; suffered severely by fire, May 3, 1901, which destroyed one third of the residences, one half of the business houses, and with few exceptions all of the city and county buildings and churches; loss estimated at $12,000,000. Pop. (1906) 36,675.

Jacksonville, capital of Morgan Co., Ill.; 30 m. W. of Springfield; is the seat of the Central Illinois Hospital for the Insane, the Illinois Institution for the Blind, the Illinois Institution for the Deaf and Dumb, Illinois College, Illinois Female College, Jacksonville Female Academy, State Conservatory of Music, and of a Lutheran orphan asylum; and manufactures flour, foundry and machine-shop products, carriages, woolen goods, silk and woolen underwear, soap, ice, and brick and tile. Pop. (1906) 16,362.

Jack Tree, popular name of a tree (the *Artocarpus integrifolia*) which originated in the E. Indies, and is now naturalized throughout a large part of the tropical world; produces a fruit resembling, but much larger than, the breadfruit, to which it is very closely related, and though its taste is not pleasant, thousands of the lower classes of India eat it as food.

Jacme II, called THE JUST; abt. 1259–1327; King of Aragon and Count of Barcelona, grandson of Jacme I, King of Aragon, and second son of Pedro III, on whose death, 1285, he became King of Sicily. On the death of his brother, Alfonso III, 1291, he succeeded him on the throne of Aragon, leaving the government of Sicily to his brother Frederic. He maintained wars with Naples, Genoa, and Pisa (conquering the islands of Sardinia and Corsica), as well as with the Moors of Granada and Tripoli; founded the Univ. of Lérida; expelled the Knights Templars from the kingdom; and died at Barcelona, leaving the throne to his son, Alfonso IV. During his long reign Aragon enjoyed the new experience of internal peace. Jacme bore the surname of "The Just" deservedly.

Jacmel (zhäk-měl'), town and port of Haiti; at the head of a bay on the S. coast; 27 m. SW. of Port au Prince. The harbor is deep and commodious. The city is divided into an upper and lower town, the former called Belair. Jacmel has an active trade, and is a regular port of call for mail steamers from the U. S. It was a point of importance during the wars at the end of the eighteenth century. Pop. abt. 6,000.

Ja'cob, third and last of the Hebrew patriarchs; son of Isaac and Rebekah; and younger twin brother of Esau. He was called Jacob (Ya'akob, "heel-holder") because his hand took hold on his brother's heel at their birth. Obliged to flee from Esau's wrath, whom he had defrauded of his birthright, he served seven years for his uncle Laban's daughter Leah, another seven years for Rachel, and six years longer for a herd, and then departed with his possessions for Canaan. On his way he met and was reconciled with Esau; and in consequence of a vision his name was changed to Israel. He tarried successively at Succoth, Shechem, and Bethel. Rachel died in giving birth to Benjamin. His favorite son Joseph, sold by his brethren and carried to Egypt, became the highest officer at court, and during a famine brought his father's family thither. Israel lived seventeen years in the land of Goshen, where he died at the age of 147. At his own command he was buried with Abraham and Isaac near Mamre. His twelve sons became the heads of the twelve tribes of Israel.

Jacobæ'an Lil'y, popular name of a species of amaryllis (*A. formosissima*); a beautiful S. American flower which has been acclimated in

JACOBÆAN LILY.

the U. S. Its bulb is large, dark-colored, and long-necked, protruding above the surface of the ground; the flowers, which appear before

the leaves, are large, irregular in shape, and are of a brilliant crimson color.

Jacobi (yä-kō'bē), **Friedrich Heinrich**, 1743–1819; German philosopher; b. Düsseldorf; first works were the philosophical romances, "Woldemar" and "Eduard Allwill's Correspondence," the former of which reveals his ethical system, making morality a matter of instinctive sentiment, rational intuition, or divine impulse. It was never his purpose to develop any connected system, and his philosophical writings are all brief. The first was "On the Doctrine of Spinoza," in which he assails Spinozism. His doctrine is more fully developed in his dialogue entitled "David Hume on Faith, or Idealism and Realism." His principal works, besides those mentioned, are "Letters to Fichte" and "Of Divine Things and Their Revelation," which occasioned a controversy with Schelling.

Jacobi, Karl Gustav Jakob, 1804–51; German mathematician; b. Potsdam; was appointed adjunct, 1825, and Prof., 1827, in Mathematics at Königsberg. His importance in the history of mathematics is chiefly due to his discoveries in the theory of elliptic functions, and his principal work is the "Foundations of the New Theory of Elliptical Functions."

Jacobi, Mary Putnam, 1842–1906; American physician; b. London, England; daughter of George P. Putnam, of New York; graduated at the Woman's Medical College, Philadelphia; the College of Pharmacy, New York, and the School of Medicine, Paris, being the first woman graduate in the two last institutions; began practice in New York; was appointed Prof. of Materia Medica in the New York Infirmary for Women and Children; was married to Dr. Abraham Jacobi, 1873; published "The Value of Life," "Cold Pack and Anemia," "Hysteria and Other Essays," "Studies in Primary Education," and other works.

Jac'obin, breed of domestic pigeons having the feathers of the neck turned forward so as to form a ruff which encircles the neck and covers the head like a hood, whence the name. The color may be either black or yellow.

Jacobini (yä-kō-bē'nē), **Ludovico**, 1832–87; cardinal; b. Genzano, Italy; secretary of the Propaganda for the Eastern Churches; under secretary of the Ecumenical Council of 1867; nuncio to the Austrian court; began negotiations with Bismarck for settlement of disputes with Prussia; elevated to the cardinalate and made Pontifical Secretary of State, 1879; subsequently secretary of the Propaganda, prefect of the Laurentani Congregation, and administrator of the estates of the Holy See.

Jacobins (jăk'ō-bĕnz), most celebrated of the clubs of the first French Revolution. Its origin is traced to the club Breton established at Versailles, May, 1789, which on the removal of the Constituent Assembly to Paris met in the old convent of the Dominican friars of St. James, or Jacobins, and assumed the name of Société des Amis de la Constitution, but was popularly styled Jacobins. It soon became the controlling power of the revolution. Extreme opinions gaining the ascendancy in it, its original founders seceded, and established the Société de 1789, or des Feuillants. The Jacobins extended their influence all over France, 1,200 branch societies being established previous to 1791, and the number increasing afterwards. They were foremost in the insurrectionary movements of June 20 and August 10, 1792, originated the commune of Paris, and changed their name to Les Amis de la Liberté et de l'Égalité. Robespierre was indebted for his power to the popularity he had secured among them. His downfall was a fatal blow to the Jacobins. The reactionary affiliation styled *la jeunesse dorée* attacked their headquarters, and the convention suspended their meetings in November, 1794. The scattered remains of the party established new clubs, but did not regain their influence.

Jac'obites, in ecclesiastical history, an Oriental Christian sect, monophysitic in doctrine, deriving their name from Jacob Baradai, "the ragged," originally a monk and presbyter near Nisibis in Mesopotamia, who became Bishop of Edessa, 541 A.D., and d. 578. He took on himself the general superintendence of Monophysites in the East, and brought their number up to about 100,000, mainly in Mesopotamia and Syria. In the time of Gregory XIII (1572–85) they numbered only 50,000 in Syria, Mesopotamia, and Babylonia. They are now still more reduced. In Syria they are a mere handful in a few villages, and very poor. They are under a patriarch, who resides in a monastery near Mardin. In public worship use is made of the ancient Syriac language, which the people do not understand. There are said to be 200,000 Jacobites in India (Malabar and Travancore). Of the United or Roman Catholic Jacobites in Syria there are no statistics. Attempts were made to Romanize them as early as the fourteenth century, but with no considerable success till the seventeenth. About 96,000 Roman Catholic Jacobites are claimed in India.

Also JACOBITES, in English history, the partisans of King James II, dethroned, 1688. They were strongest in Scotland, rebelling twice (1715 and 1745), and were not wholly extinct as a party till after the death of Charles Edward, the Pretender, 1788.

Ja'cob of Vitry', d. 1240; French crusader, writer, bishop, and cardinal; b. Argenteuil; was first a parish priest at Argenteuil; then undertook to preach a crusade against the Albigenses, and finally devoted himself to the interest of the Holy Sepulcher at Jerusalem; was appointed by Pope Honorius III (1217) Bishop of Acre in Palestine, where he effected great conversions of Saracen children; resigned that bishopric, 1225; was appointed by Pope Gregory IX, 1229, Cardinal Bishop of Tusculum, and papal legate of France, Brabant, and the Holy Land; died in Rome; was the most elegant preacher of the time, but his fame rests on his "Historia Orientalis," generally called "History of Jerusalem," a valuable source of information on the crusades.

Jacobs (yä'kŭps), **Christian Friedrich Wilhelm,** 1764–1847; German author; b. Gotha; was keeper of all the art collections in Gotha, 1831–42, and published over fifty volumes, the principal of which are his editions and translations of the classics.

Jacotot (zhä-kō-tō'), **Jean Joseph,** 1770–1840; French educator; b. Dijon; was successively Prof. of Humanities in the college of his native town, subdirector of the Polytechnic School, a soldier during the campaign in Belgium, a private teacher in Belgium, and Prof. of French Literature in the Univ. of Louvain, 1818–30; was the originator of the system of "universal instruction," which makes the teacher simply a guide, and obliges the pupil to do his own thinking and so teach himself; "to learn *something* and *refer* to that all the rest;" his plan, as applied to languages, is similar to that of James Hamilton, and also to the Ollendorff method.

Jacquard (zhä-kär'), **Joseph Marie,** 1752–1834; French inventor; b. Lyon; son of a weaver; after a long period of poverty and obscurity, invented, abt. 1801, the loom which made his name a household word in both continents; was mobbed, 1804, by the operatives of Lyon, who feared that the new loom would be ruinous to their class; received during his lifetime the cross of the Legion of Honor.

Jacque (zhäk), **Charles Émile,** 1813–94; French animal and landscape painter; b. Paris; studio in Paris; was first a map engraver, then a soldier, next a draughtsman on stone and wood, and finally a painter and an etcher of marked ability; for paintings of peasants and farm animals, received medals, 1861, 1863, 1864, and first-class medal, Paris Exposition, 1889. His brother Émile, and his son Léon, became well known as etchers.

Jacqueline (zhäk-lēn'), 1400–36; Princess of Bavaria; only daughter and heir of William VI of Bavaria, Count of Holland and Hainault, and of his wife, Margaret of Burgundy; succeeded to her father's estates, 1417; wedded her cousin, John IV, Duke of Brabant, but soon abandoned him and went to England, where, 1423, she wedded Humphrey, Duke of Gloucester, a brother of Henry V, her first marriage having been annulled by the antipope, Benedict XIII; after the death of her first husband, assumed the title of Duchess of Gloucester, and renewed the war Gloucester had undertaken to recover her lands, which had been seized by the dukes of Burgundy and Brabant; was forced to make a treaty with the former, and finally to cede her estates to him, in order to secure the release of Francis of Borselen, her third husband.

Jacquemart (zhäk-mär'), **Jules Ferdinand,** 1837–80; French painter and etcher; b. Paris; son of Albert Jacquemart (1808–75); author of the "History of Porcelain," "The History of Ceramics," "The History of Furniture and Decorative Objects," and other works on industrial art; illustrated the "Porcelain" by etchings of great beauty, the "Ceramics" by etchings and small woodcuts, and the other work by many process engravings from his drawings. He had great skill as a technical etcher, and was an original artist of merit, as shown in both water color and in engraving.

Jacquerie (zhăk-rē'), French servile insurrection, led by Guillaume Caillet or Charlet, who assumed the name of Jacques Bonhomme, which the nobles derisively applied to the peasants on account of their meek submission to oppression. The peasants first rose near Beauvais, May 21, 1358, and soon rallied round them a force of more than 100,000 insurgents, who destroyed over 200 castles and mansions. The Duchess of Orleans and 300 other ladies sought refuge in Meaux. Here the peasant force of 9,000 men was massacred by the troops of the nobles, and Jacques Bonhomme and his companions were tortured and slain by Charles the Bad, King of Navarre, who routed the rest of their followers. More than 20,000 peasants perished during the three weeks of the insurrection.

Jacuhy (zhä-kō-ē'), river of Brazil; in the State of Rio Grande do Sul; rises in the N. part of the state and, after entering the N. end of the Lagoa dos Patos, finds its way to the Atlantic. The lower end of the river, near the lake, is expanded into a broad sheet, which bears the special name Guahyba. The lake itself, with its outlet, the Rio Grande, may be regarded as a continuation of the river. Total length of the river to the lake, about 310 m.; or, including the lake and the Rio Grande, about 470 m. Ocean steamers ascend to Porto Alegre, 170 m. from the sea, and small steamboats to Cachoeira, 120 m. farther.

Jacusi (jäk-ō'sē), in Japanese mythology, the god of medicine.

Jadassohn (yä'dä-sōn), **Salomon,** 1831–1902; German musician; b. Breslau; after 1853 resided in Leipzig; composed several symphonies, much orchestral music in the smaller forms, some concertos for solo instruments, songs, etc.; also set Psalm cl in cantata form for alto solo, double chorus, and orchestra.

Jade, name under which may be grouped three minerals: (1) Nephrite, a silicate of magnesia, with a great degree of toughness, the general color being green or white, sometimes yellowish, brownish, or black; (2) jadeite, a silicate of alumina, with a crystalline granular structure, not quite so tough as nephrite; (3) chloromelanite, a silicate of alumina and iron, referred to jadeite by some authorities. The green variety of jade was used by the aborigines of New Zealand, New Caledonia, the South Sea Islands, and Alaska, and is found in Switzerland, in the lake dwellings, and in other parts of Europe. Jadeite implements of prehistoric age are found in Central America, Mexico, Peru, Switzerland, Spain, and France; chloromelanite in the Swiss lake dwellings. Jadeite has never been found in place on the N. American continent; but it is believed that it will be found in Mexico and Central America. Nephrite, the *yu* of the Chinese, is mined in Siberia, Turkestan, and New Zealand. Jadeite, the green called imperial

jade—*fetsui* of the Chinese—is found at Monghoung, in Burma. Since early times jade has been considered a sacred stone in China, and has been finished with great labor and care into bracelets, thumb rings, etc., and into carved vases, coupes, and other ornaments. In India jade has been used for amulets, sword handles, dagger hilts, and other objects, and sometimes inlaid with designs made in pure unalloyed gold, in which there are generally set rubies, emeralds, diamonds, and other gems.

Jaeger (yä'gĕr). See SKUA.

Ja'el, in biblical narrative, the wife of Heber the Kenite. When Sisera, the general of Jabin, King of Hazor, sought refuge in her tent after the defeat of his army, and had lain down to sleep, she drove a nail through his head and killed him.

Jaf'fa, Yaf'fa, or Jop'pa, town of Asiatic Turkey, in Palestine; on the Mediterranean; 33 m. NW. of Jerusalem, of which it has always been the port. According to Strabo and Josephus a haunt of pirates, it was destroyed by Vespasian in the Jewish war. It was captured by Saladin, 1187; by Richard I of England, 1191; by Malek el Adil, 1196; and by Bonaparte, 1799. The harbor is exceedingly bad and precarious. The town is connected with Jerusalem by a carriage road frequently in bad condition, and since 1892 by a railway.

Jaffna (jäf'nä), or **Jaffnapatam'**, town of Ceylon; on the N. extremity of the island; was originally a Dutch settlement, and the European part of the city has still a Dutch aspect. Pop. (1901) 33,879.

Jagannath (jä-gän-näth'). See PURI.

Jagellons (yä-gĕl'lônz), name of a dynasty which reigned from the fourteenth to the seventeenth century in Poland, and during much of the time in Lithuania, Hungary, and Bohemia. The founder of the family was Jagellon, or Jagiello, b. abt. 1354, Grand Duke of Lithuania, who married Hedwig, daughter of Louis the Great, King of Poland and Hungary. Sigismund Augustus, who died 1572, was the last Jagellon King of Poland in direct succession, but through the female line the family retained the throne until the abdication of John Casimir, 1668.

Jag'gery, sugar obtained in India from various palm trees, notably the cocoanut palm, the toddy palm, and the jaggery palm. The tapping of the trees and the boiling of the sap are carried on by a special caste. After refining, the sugar is identical with cane and beet-root sugar.

Jaguar (jä-gwär'), member of the cat family, or *Felidæ* (*Felis onca*), the largest representative in America, found from Texas to Patagonia, inhabiting forests by preference, and somewhat arboreal in its habits. It is exceeded in size by the lion and tiger, but is more massively built than the leopard, which it resembles in color, being of a rich yellow with black spots arranged in the form of rosettes. The rosettes of the jaguar differ

JAGUAR.

from those of the leopard, however, in having one or two black points in the center.

Jahn (yän), **Friedrich Ludwig**, 1778–1852; German educator; popularly known as "Turnvater Jahn"; b. Lanz, Brandenburg; was a teacher in Berlin, 1809; opened a turn establishment on the Hasenheide, by Berlin, 1811; served in the army; lectured in Berlin on the German Volksturn, 1817–19; was imprisoned as a demagogue; after 1825 lived in Freiburg and Kölleda; entered the National Assembly, 1848. Jahn had fantastic notions about bringing about a return to the old German civilization of the times of Hermann through perfect physical training, but he made gymnastics universally popular in Germany.

Jahn, Johann, 1750–1816; German Orientalist; b. Taswitz, Moravia; was Prof. of Dogmatic Theology and Oriental Literature at Vienna till 1806, when his heterodox views necessitated his resigning; published Chaldean, Arabic, Syrian, and Hebrew grammars, "Introduction to the Old Testament," "Biblical Archæology," and "Manual of General Hermeneutics."

Jahn, Otto, 1813–69; German philologist; b. Kiel; became, 1855, Prof. at Bonn, having previously been suspended at Leipzig for his liberalism; was an eminent expounder of classical archæology and philology, and published valuable editions of Latin classics, instructive works relating to ancient art, and a celebrated biography of Mozart.

Jail, place of confinement for criminal offenders, suspects held for trial, debtors, etc.; a prison. In legal literature the word jail is used not only in this general sense, with little or no distinction from prison, but also specifically in a narrower sense. In England it is specifically used of the local or county jails which are used for the confinement of persons arrested for debt or for the commission of minor offenses, or for the temporary confinement

of persons awaiting trial, or of witnesses, and which are the subject of periodic jail delivery. In the U. S. the word is similarly used for the local places of imprisonment as distinguished from the state prison or penitentiary. The form gaol is the one used in Great Britain in the technical sense, but is seldom used in the U. S. The term gaoler is defined by statute to be the governor of any prison. See PRISON.

Jail Fe'ver. See TYPHOID FEVER.

Jains (jīnz), **or Jainas** (jī'näz), adherents of Jainism, a religious system that originated in India about the same time as Buddhism, to which it has some resemblance, and, like it, was a protest against Brahmanical Hinduism. The Jains, who (1901) numbered about 1,334,000, are found over all Hindustan, but are most numerous in Mewar, Guzerat, and the Upper Malabar coast. Their prophet was Vardhamana, better known by his epithet of Mahavira, and they have a considerable religious literature in Prakrit. The Jains believe in a series of religious teachers (called in their case Jinas or "conquerors," of whom Vardhamana was the twenty-fourth) in reincarnation, in the attainment of Nirvana, in the practice of the four virtues of liberality, gentleness, piety, and magnanimity, in goodness in thought, word, and deed; in especial kindness to animals and consideration even of plants (because they all have souls), and in numerous angels and demons.

Jaipur (jī'pôr), city of Rajputana, India, and capital of the state of the same name; 155 m. SW. of Delhi; is at the edge of the desert, which extends toward the W. and S., but is itself filled with gardens and trees, and presents a very attractive aspect. The streets are broad, the buildings generally fine. The city was founded, 1728; has been celebrated as a center of Brahmanic studies, and is the center of a large and growing commerce. Pop. (1901) 160,167.

Jaisalmir (jī-säl-mēr'), former tributary state and town of W. Rajputana, India; has on the N. the Punjab, E. Bekanir and Marwar, S. Marwar, and W. Bombay Presidency and the Punjab; area, 16,062 sq. m.; pop. (1901) 73,370; occupies the central part of the Thar, or Indian Desert; most of the inhabitants are Jats, who live in villages, raise cattle, and cultivate barley and millet; ruling race is the Rapjut clan of Bhatti, who live for the most part in the capital; also named Jaisalmir, and includes a full third of the population of the state; is a regularly built and attractive town, on a considerable lake, which permits the formation of a large oasis. There are many ancient Jain monuments near the town.

Jakob (yä'kūp), **Ludwig Heinrich von,** 1759–1827; German author; b. Wettin, Prussia; Prof. of Philosophy at Halle, 1791–1807; of Political Economy at Kharkoff, 1807, and at Halle, 1816–27; was chief reviser of the Russian criminal laws; author of "Handbook of National Economy" and other esteemed works.

Jakutsk (yä-kōtsk'). See YAKUTSK.

Jal (zhäl), **Auguste,** 1795–1873; French author; b. Lyons; was placed in charge of the archives of the Ministry of Marine; made several journeys for the purpose of discovering manuscripts in Italy, Greece, and Turkey, and wrote numerous works of art criticism, naval and general history, archæology, and biography, of which the most important was the "Dictionnaire Critique de Biographie et d'Histoire," a vast repertory of documents and biographical materials intended to rectify and supplement all previous works of the kind.

Jalalabad (jäl-ä-lä-bäd'). See JELALABAD.

Jalandhar (jä'län-thär). See JULLUNDUR.

Jal'ap, cathartic drug, the dried root of *Ipomœa purga*, natural order *Convolvulaceæ*. This is a climbing plant, with large lilac-purple flowers, growing in the mountains above the city of Jalapa, Mexico. The root is turnip-

JALAP PLANT.

shaped or radish-shaped, blackish without, gray within, varying in size from that of a walnut to that of a good-sized pear. Its active principle is a resin jalapin, consisting of hard and soft portions, both apparently equally effective medicinally.

Jalapa (chä-lä'pä), capital of the State of Vera Cruz, Mexico; on the E. slope of the Mexican plateau, at the base of the Macultepetl peak, 4,315 ft. above the sea. The city and its neighborhood command a magnificent range of scenery, including the Peroti Mountains and the snow-capped peak of Orizaba. Regular fairs are held, and the place has an active trade. During the colonial period it was important as a station on the road from Vera Cruz to Puebla and Mexico. Though this is the official capital of the state, the government often sits at Vera Cruz or Orizaba. Pop. (1900) 20,388.

Jalisco (chä-lēs'kō), W. state of Mexico; bounded N. by Durango, Zacatecas, and Aguas Calientes, E. by Guanajuato and Michoacan, S. by Michoacan and Colima, and W. by the Pacific and Tepic territory; area (excluding the territory of Tepic, now separated from it), 27,264 sq. m.; is traversed from N. to S., through the center, by a complicated mountainous belt, a continuation of the Sierra Madre

del Pacifico; this includes, on the S. border, the volcano of Colima (12,743 ft.), the Ceboruco volcano, and other summits above 10,000 ft. high. Partly included in the mountain region is the fertile plain of Ameca, 4,100 ft. high; E. of the mountains is the plateau of Guadalajara, averaging 5,000 ft., with the beautiful lake of Chapala at its S. end; and to the W. there is a succession of volcanic hills and plateaus falling to the low region of the coast. Jalisco is rich in minerals, especially silver, and formerly the output was enormous; the annual production still averages in value $1,500,000. Gold and copper are also mined. The manufacture of cotton and woolen cloths and saddlery is quite extensive. The Spaniards entered Jalisco abt. 1526, and it was conquered soon after by Nuño de Guzman. The Kingdom of Nueva Galicia, then formed, included very nearly the present states of Jalisco, Aguas Calientes, and Zacatecas; the governors, who were also presidents of the audience of Guadalajara, were only nominally subject to the viceroys of New Spain. Pop. (1900) 1,153,-891.

Jamaica (jä-mä'kä), island of the W. Indies, one of the Great Antilles, belonging to Great Britain; in the Caribbean Sea; 90 m. S. of E. Cuba; area, 4,200 sq. m.; pop. (1907) 830,261, chiefly negroes and mulattoes; white pop. (1901) 14,692; capital and principal port Kingston; other towns, Spanish Town, Montego Bay, Savanna-la-Mar, Falmouth. Political dependencies are Caicos and Turks Islands, in the Bahamas; Grand and Little Cayman Islands, to the NW.; Morant Cays and Pedro Cays, having together about 224 sq. m. Jamaica is mountainous throughout, and the E. part of its central ridge, called the Blue Mountains, has one peak 7,360 ft. above the sea. The climate is mild and equable; mean temperature at Kingston, 78.1° F.; mean total rainfall for the whole island, 66.30 in. yearly. There are no mines and no important mineral products of importance, excepting building stone and limestone; principal industries, agriculture and timber cutting; chief agricultural products, sugar, coffee, bananas, tobacco, cocoanuts, corn, cocoa; chief exports, coffee, dyewoods, fruits, rum, and pimento. The government is administered by a governor, a privy council, and a legislative council of twenty-nine members, fourteen of whom are elected; chief religious bodies, Church of England, Baptist, Wesleyan Methodist, United Methodist Free Church, Presbyterian, Roman Catholic, Moravian, Congregational. Educational institutions include four government training colleges for teachers and a high school near Kingston, largely supported by the government. Jamaica was discovered by Columbus, May, 1494; colonized by the Spaniards, 1509; captured by an English expedition sent out by Cromwell, 1655; soon became one of the chief centers of the sugar industry, which was built up by imported slaves; slavery abolished, 1834; Port Royal, the old capital, destroyed by an earthquake, 1692, which led to the settlement of Kingston; that city devastated by an earthquake and fire, January 14, 1907, but speedily rebuilt.

Jamaica, former town and capital of Queens Co., N. Y.; now a part of the Borough of Queens, in the Greater New York; was settled, 1656; contains many buildings antedating the Revolutionary War; is in a region widely known for its market-gardening interests; contains the residences of many New York and Brooklyn business men, and has manufactories of carriages and other articles.

Jambudvipa (jäm-bō-dwē'pä), in Hindu mythology, one of the seven continents or islands which surround Mt. Meru and make up this universe. With the Buddhists it is that one of the four great continents which lies S. of Mt. Meru, and is identified with India. With the Jains it is confined to one of the five divisions of India.

James, son of Zebedee, called THE GREATER, one of the twelve apostles and brother of John; was a fisherman on the Lake of Galilee when called to follow Jesus, and with Peter and John formed a group distinguished from the other apostles by being the chosen witnesses of several of the chief incidents in the ministry of Christ. Such were the transfiguration, the restoration to life of Jairus's daughter, and the agony at Gethsemane. James and John, with their mother, Salome, appear at one time to have entertained false views of the nature of Christ's kingdom, and to have aspired to a sort of primacy, which was rebuked by Jesus; who on another occasion gave the brothers the appellation of Boanerges ("sons of thunder"), perhaps at the time when they rashly invoked fire from heaven on a Samaritan village. James was the first martyr among the twelve, having been killed by the sword of King Herod Agrippa, 44 A.D. He is commemorated in the calendar of saints by the Roman Catholic Church, July 25th, and by the eastern Church, October 23d. Under the name of Santiago (St. Jago) de Compostella he was venerated from an early day in Spain as the patron of the kingdom.

James, son of Alphæus, called THE LITTLE, or the LESS; one of the twelve apostles. His mother's name was Mary (Matt. xxvii, 56; Mark xv, 40), who is called (John xix, 25) "the wife of Cleophas," and is referred to in the same verse as a "sister" of Mary, the mother of Jesus. Whether this James is the same as "James, the Lord's brother," spoken of by Paul in Gal. i, 19, has been much discussed, but it is generally decided that he is. Assuming the affirmative answer the most consistent solution of the apparent discrepancies in the New Testament references seems to be that the two Marys, the mothers of Jesus and of James, are called *sisters* in John xix, 25, by virtue of their marriage with two brothers, Joseph and Cleophas (otherwise Alphæus—the names are really the same). He is first heard of, 28 A.D., when, with his younger brother Jude, he is called to the apostolate. To him Jesus made a separate appearance. When next we hear of him, ten years later, 30 A.D., it is as head of the Church at Jerusalem, and (according to the above theory) he wrote the epistle known by his name. Early Christian writers give him the name of James the Just.

THE EPISTLE OF JAMES, one of the canonical books of the New Testament, first of the so-called Catholic epistles; ascribed to James the Little. The epistle is believed by the majority of critics to have been written several years before the destruction of Jerusalem by the head of the Jewish Church, and addressed to the Jewish Christians of Asia Minor. The thought is vigorous and the Greek pure. Its "doctrine of justification by works" (ii., 14–26) has occasioned more controversy upon this epistle than upon almost any other book of the canon, it being regarded by some as irreconcilable with Paul's doctrine of justification by faith.

James, name of two kings of Great Britain, who follow: JAMES I (VI of Scotland), 1566–1625; b. Edinburgh Castle; only son of Mary, Queen of Scots, and Henry Stuart, Lord Darnley; was descended through both parents from Margaret Tudor, daughter of Henry VII; was crowned at Stirling, July 29, 1567, his mother having been imprisoned and forced to abdicate; nominally took the government into his own hands, 1577, the regency having been successively in the hands of powerful nobles; was in reality a figurehead, earls Morton and Arran and the Duke of Lennox, whom he had made his favorites, ruling until a party of nobles confined James in Ruthven Castle and compelled him to issue a proclamation against Lennox and Arran. He made a treaty with Elizabeth, receiving from her a pension, 1587; vainly interceded for his mother's life; coöperated with England in preparations against the Spanish Armada, 1588; married Princess Anne of Denmark, 1589; warred against several Roman Catholic lords, 1590–97; succeeded Elizabeth, 1603, and was crowned at Westminster July 25th.

He presided at the Hampton Court conferences, 1604; exiled Jesuits and seminary priests; assumed the title of King of Great Britain, France, and Ireland, 1604; lavished honors on unworthy favorites, one of whom, Villiers, was made Duke of Buckingham, 1623; was zealous in forcing episcopacy on Scotland; granted a patent, 1606, organizing the London and Plymouth companies, one result of which was the founding of Jamestown, Va.; and appointed a commission to revise the English translation of the Bible. He made a defensive alliance with the Protestant Union in Germany, 1611; refused to aid his son-in-law, Frederick, Elector Palatine, whom the Bohemians had chosen as their king, and who was attacked by the forces of Austria and Spain; and executed, 1618, Sir Walter Raleigh, charged with an attempt to put Arabella Stuart on the throne. He rebuked Parliament for alleged meddling in affairs of state, which caused that body, 1621, to pass the "Great Protestation" asserting its right so to do; sought an alliance with Spain through the marriage of his son Charles with a Spanish princess, and on the failure of the negotiations, 1624, declared war against that power, but died shortly after.

James was despicable in his personal qualities; was weak, cowardly, vindictive, and fanatical; thoroughly believed in his divine right to rule, setting forth his views on that subject in "Basilikon Doron," 1599. Among other works by him are "Essays of a 'Prentice in the Divine Art of Poesy," "True Law of Free Monarchies," "Remonstrance for the Right of Kings," "Counterblast to Tobacco." Of his seven children, only two, Prince Charles and the Princess Elizabeth, survived him.

JAMES II (VII of Scotland), 1633–1701; b. London; son of Charles I; escaped, 1648, from the Parliamentarians and fled to the Low Countries; served under Turenne and Condé; became captain general in Italy, 1656, in which year he entered the Spanish service and fought against Turenne; appointed Lord High Admiral of England and Lord Warden of the Cinque Ports, 1660; married Anne Hyde, daughter of Lord Clarendon, 1660; commanded against the Dutch, 1665–72; avowed himself a Roman Catholic, 1669, and married Mary of Este (Modena), 1673. He retired to Brussels during the unsuccessful agitation for excluding him from the throne; and, as Lord High Commissioner for Scotland, persecuted the Covenanters, 1679.

He succeeded Charles II, 1685; subdued Argyll's invasion of Scotland and Monmouth's invasion of England, following them with unparalleled punishments, made persistent attempts to overthrow constitutional government, and to establish arbitrary royal power and the Roman Catholic religion; imprisoned the bishops for petitioning to be excused from reading the "Declaration of Indulgence" (*q.v.*); established new and illegal tribunals, and maintained a standing army without legal warrant. On the invasion of William, Prince of Orange, James fled to France, but, 1689, invaded Ireland, where, at the Boyne, he was defeated, 1690; retired to France, and died at St. Germain en Laye. Of eight children by his first wife, only Queen Mary and the Princess Anne survived him; of six children by the second wife, two outlived him. He had five other (illegitimate) children.

James, name of seven kings of Scotland, who follow: JAMES I, 1394–1437; b. Dunfermline; son of Robert III; was captured by the English while on his way to France, 1406, and imprisoned in the Tower, in Nottingham Castle, Evesham, and Windsor Castle, and wrote the "King's Quhair" and other poems while in confinement; accompanied Henry V in his French campaigns; married Joanna Beaufort, granddaughter of John of Gaunt, 1424; was liberated, proclaimed king, and crowned at Scone, 1424; restored order to Scotland, and used so much rigor toward the turbulent nobles that he was murdered by their emissaries at Perth.

JAMES II, 1430–60; son of James I and Queen Joanna Beaufort; was crowned at Edinburgh when but six years of age; assumed the government, 1449; married Mary of Gueldres the same year; murdered William, eighth Earl of Douglas, with his own hand, 1452; defeated a powerful insurrection headed by the ninth earl; made a treaty with Henry VI of England, 1459, by which he acquired the counties of Durham and Northumberland, in consideration of supporting the House of Lancaster in the War of the Roses, and was killed by the bursting of a gun at the siege of Roxburgh.

JAMES III, 1451–88; son of James II and Queen Mary of Gueldres; was crowned at Kelso monastery on his father's death, 1460. During his minority the government was administered by Bishop Kennedy and Lord Boyd. James married the Princess Margaret of Denmark, 1469, thereby acquiring the Orkney and Shetland Islands; experienced several insurrections; imprisoned on a charge of witchcraft his brother, the Earl of Mar, who soon died; maintained a war with another brother, the Earl of Albany, who laid claim to the crown, and was supported by Edward IV; was besieged in Edinburgh Castle, and reconciled to his brother, 1482; had to wage another war against the nobles, who had placed at their head his son, Prince James, 1487, and was either killed in battle or murdered thereafter at Sauchie, near Bannockburn.

JAMES IV, 1473–1513; son of James III and Margaret of Denmark; joined the rebellious nobles against his father, 1487; was crowned at Scone, 1488; suppressed an insurrection headed by Lords Forbes and Lyle and the Earl of Lennox, 1489; favored the impostor, Perkin Warbeck, whom he received at his court as King of England, 1495, on whose behalf he made war on England, 1496–97, but finally concluded a truce for seven years, and in 1503 married Margaret, daughter of the English king, Henry VII; in 1513, took offense at a supposed insult from his brother-in-law, Henry VIII, invaded England, and was defeated and slain at Flodden Field.

JAMES V, 1512–42; son of James IV and Margaret of England; succeeded to the throne under his mother's regency, 1513; assumed the government, 1528; married Madeleine of France, 1537, and, on her death, Mary of Lorraine, daughter of the Duke of Guise, 1538; met with signal defeat from the English at Solway Moss, November 25, 1542; died at Falkland Palace; was succeeded by his infant daughter, Mary, Queen of Scots.

JAMES VI. See JAMES I, England.

JAMES VII. See JAMES II, England.

James, Henry, 1811–82; American theologian; b. Albany, N. Y.; went to Europe, where he acquired Sandemanian and afterwards Swedenborgian views; resided for many years in New York City, at Newport, R. I., and at Cambridge, Mass.; published "What is the State?" "Moralism and Christianity," "The Church of Christ," "The Secret of Swedenborg," and other works.

James, Henry, 1843– ; American author; b. New York; son of the preceding; resided mostly in Europe after 1869; works of fiction include "Watch and Ward," "The American," "Daisy Miller," "The Europeans," "The Portrait of a Lady," "The Bostonians," "The Tragic Muse," "The Spoils of Poynton," "The Two Magics," "The Awkward Age," "The Sacred Fount," "The Wings of the Dove," "The Golden Bowl"; critical and miscellaneous works include "Transatlantic Sketches," 1875; "French Poets and Novelists," "Portraits of Places," "Hawthorne," "A Little Tour in France," "English Hours," "The Lesson of Balzac," "The American Scene."

James, Sir Henry, 1803–77; English engineer and military officer; b. Rose-in-Vale, Cornwall; entered the army as lieutenant of engineers; became colonel, 1857, and lieutenant general, 1874; after directing the geological survey of Ireland, and the admiralty engineering works at Portsmouth, was appointed, 1852, superintendent of the ordnance survey of the United Kingdom, and, 1857, chief of the topographical and statistical departments of the War Office; knighted, 1860; applied the new processes of photolithography to the reproduction of improved ordnance surveys, 1860, and invented a modification of this process, known as photozincography.

James, Robert, 1703–76; English physician; b. Kinverston, Staffordshire; practiced at Sheffield, Lichfield, Birmingham, and London; published, with the aid of Dr. Samuel Johnson, a "Medical Dictionary" (three volumes, folio, London, 1743–45), and invented the celebrated fever powder known by his name, now called antimonial powder, which was one of the earliest and most successful prototypes of the so-called patent medicines.

James, Thomas, English navigator, who in 1631 was sent by merchants of Bristol to search for a NW. passage; explored Hudson Bay, and from him the S. portion is still called James Bay; reached latitude 65° 30′ N., and then, his further progress being stopped by ice, returned to England; published "The Strange and Dangerous Voyage of Capt. Thomas James for the Discovery of a Northwest Passage to the South Sea."

James, Francis Edward Stuart (Prince of Wales), called also the CHEVALIER DE ST. GEORGE and the OLD PRETENDER, 1688–1766; b. London; son of King James II and Mary of Modena; was the natural heir to the throne; lived in France after his father was driven from power; took part in the French campaigns of 1708–09 against the English in Flanders, and, in spite of the efforts of his sister Anne and numerous statesmen, failed of succession to the throne because of his refusal to renounce Roman Catholicism. He accepted an invitation to head the Jacobite rising in Scotland, 1715; made a public entry into Dundee, and occupied the royal palace at Scone, but was forced to retreat to France. He married, 1719, Princess Sobieski of Poland, by whom he had a son, Charles Edward, the Young Pretender of 1745, and passed his closing years in pious retirement at Rome.

James Bay, part of Hudson Bay; named from Capt. Thomas James, who wintered here, 1631–32, while attempting to find a NW. passage. It abounds in shoals and islands.

Ja'meson, Anna (MURPHY), 1797–1860; British author; b. Dublin, Ireland; daughter of Brownell Murphy, artist; was married, 1823, to Robert Jameson, barrister. Her writings on Christian art and archæology are of a high order; principal works are the different books unde the general title, "Sacred and Legendary Art," *viz.*: "Legends of the Saints," "Legends of the Monastic Orders," "Legends of the Madonna," and the "History of Our Lord," which,

left unfinished, was completed by Lady Eastlake.

Jameson, Leander Starr, 1853– ; British administrator; b. Edinburgh, Scotland; administrator of Rhodesia, British S. Africa, 1891–95; leader of raid into the Transvaal, December 29, 1895; defeated and captured in battle of Krugersdorf, January 1, 1896; tried in London, and sentenced to ten months' imprisonment, but was soon released; returned to S. Africa; elected to Legislative Assembly of Cape Colony, 1900; became director of De Beers Consolidated Company, 1900, and of the British S. Africa Company, 1902; Premier of Cape Colony after 1904.

Jameson, Robert, 1772–1854; Scottish naturalist and geologist; b. Leith; was educated for the medical profession, but, devoting himself entirely to natural history, explored the Scottish islands as a mineralogist, and published his discoveries, 1798 and 1800; became Prof. of Natural History in Edinburgh Univ., 1804; wrote a "System of Mineralogy" which passed through many editions; a "Manual of Mineralogy"; edited the geological department of the "Encyclopedia Britannica" (fourth edition); founded, 1819, and conducted through life, the *Edinburgh New Philosophical Journal.*

James Riv'er, river of Virginia; formed in Alleghany Co. by the union of the Jackson and the Cowpasture rivers; passes through the Blue Ridge, and pursues a devious course as far as Scottsville, whence its direction is about ESE.; at Richmond falls 100 ft. in 6 m., affording good water power. The tide comes up to the Rocketts just below Richmond, which is the head of navigation for steamboats and schooners of 130 tons. Shipping of the first class comes up to City Point, 40 m. below, at the mouth of the Appomattox. Below City Point the river is a broad, deep, and never-failing tidal estuary, 66 m. long. The river, with the Elizabeth and the Nansemond, flows into Chesapeake Bay through Hampton Roads; entire length from Covington, Va., to Old Point Comfort, about 450 m.

James'town, city in Chautauqua Co., N. Y.; on the navigable outlet of Chautauqua Lake, 69 m. S. by W. of Buffalo; is in an agricultural region; obtains power for manufacturing from the lake outlet and natural gas for fuel and illumination from wells 26 m. distant, and has long been a popular summer resort. The manufactories produce furniture, woolen and worsted goods, plush goods, boilers and engines, boots and shoes, and metallic goods. Pop. (1905) 26,160.

Jamestown, magisterial district in James City Co., Va.; was the first permanent English settlement within the limits of the U. S., and when settled (1607) was on a peninsula 32 m. from the mouth of the James; but the action of the current has changed the peninsula to an island, and carried away part of the site of the original settlement. Only the ruins of the church, the fort, and two or three houses mark the spot. Jamestown became the capital of an extensive colony, and, June 29, 1619, a House of Burgesses, the first legislative assembly ever convened in British America, met here. After the seat of government was removed to Williamsburg, Jamestown began to decline; it was burned by Nathaniel Bacon during the rebellion of 1676, and never rebuilt. It was the scene of an engagement between the forces of Wayne and Lord Cornwallis, 1781. An international exposition to commemorate the founding of Jamestown was held on the shores of Hampton Roads, 1907.

Jami (jä'mē), **Núruddín Abdur Rahmán,** 1414–92; Persian poet; last of the great mystic Sufis; b. Jam, near Herat, whence he took his poetic pseudonym; studied Sufi mysticism under the great master, Shaikh Mohammed Saaduddin Kashgari, of Herat, and later in life succeeded him; acquired widespread fame for his doctrines and poetical philosophy; was the author of forty-four—some say ninety-nine—different works in prose and verse. Seven of his mystical poems bear the collective title, "Haft Aurang," or "Seven Thrones," and include "Yusuf u Zuleikha," on the passion of Potiphar's wife for Joseph; "Baharistan," or "Garden of Spring," and "Salaman u Absal," a fable with a moral.

Ja'mieson, John, 1759–1838; Scottish author; b. Glasgow; became a minister of the Secession Church in Forfar, 1781; was called to Edinburgh, 1797; besides many theological treatises and several poems, published "Etymological Dictionary of the Scottish Language."

Jamna (jäm'nä), or **Jum'na,** river of Hindustan, and the principal affluent of the Ganges; rises in latitude 31° N. and longitude 78° 32′ E., at an elevation of 10,849 ft., flows first S. and then SE., and after a course of 680 m. joins the Ganges at Allahabad. Delhi and Agra are situated on its banks.

Janauschek (yä'now-shĕk), **Franceska Romana Magdalena,** 1830–1904; Bohemian actress; b. Prague; played tragic rôles at Cologne, Frankfort, 1848–60, Dresden, and other cities of Germany; came to the U. S., 1867, and acquired great popularity, though performing in German only; returned to Germany, 1871, and devoted herself to the study of English; returned to the U. S., which she considered her adopted country, 1873, and successfully represented in English the most difficult Shakespearean rôles; essayed such parts as *Bianca, Queen Elizabeth, Lady Macbeth,* and *Meg Merrilies,* and in the dual rôles of *Hortense,* the French maid, and *Lady Dedlock,* in a dramatization of "Bleak House," was particularly admired.

Janin (zhä-năn'), **Jules Gabriel,** 1804–74; French critic; b. St. Étienne, Loire; was connected with the Liberal opposition journal *Le Figaro*; later with the government paper *La Quotidienne*; lastly, 1836–74, with the *Journal des Débats,* to which he contributed brilliant and witty, but superficial, literary, and dramatic criticism; was elected to the academy, 1870; author of "History of Dramatic Literature," "Béranger and his Times," the novels "A Heart for Two Loves," "Confession," and other works.

Janina (yä'nē-nä), or **Joannina** (yä-än'ī-nä), town of European Turkey; capital of the eyalet of Janina, the ancient province of Epirus; has important manufactures of morocco leather, silk goods, and gold lace. It has greatly declined, however, since the days when it was the residence of Ali Pasha, who fell before the power of the sultan in 1822. Its strong castle and magnificent harem, built on promontories jutting out into the lake, are now in ruins. On the opposite shore of the Lake of Janina lay the ancient Dodona with its famous temple.

Janissaries (jän'ī-sä-rĭz), or **Jan'izaries**, corps of Ottoman foot soldiers, first organized 1329, and originally recruited solely from children of Christian parents, captured when young and brought up as Mussulmans. During more than two centuries the Ottoman victories were mainly due to their ferocity. They put to death more than one sultan, they deposed several, and they became cowardly and treacherous in battle. In 1826 Mahmoud II, obtaining a fetwah from the Sheik-ul-Islam, which declared them outlaws, aroused against them the fanatical zeal of other portions of his troops; 16,000 were slain in Constantinople, 7,000 were burned in their barracks, and 25,000 were exiled. They were replaced by an army organized on European models.

Janko (yŏn'kō), **Paul von**, 1856– ; Hungarian pianist; b. Totis; was a pupil first at the Vienna conservatory, and subsequently in Berlin. Having a very small hand, preventing him from playing effectively octaves and chords, he was led to invent a new keyboard, since known widely as the "Janko keyboard," which enables small hands to play even more effectively than large hands on the old keyboard. His original compositions were few, but he made numerous arrangements for his keyboard.

Jan Mayen's (yän mī'ĕnz) **Land**, volcanic island in the Arctic Ocean; between Iceland and Spitzbergen; area, 159 sq. m.; highest mountains, Beerenberg, 6,640 ft., and Esk, 1,500 ft., both volcanic and occasionally active, with slopes and valleys largely covered with ice fields and glaciers. The island was discovered, 1611, by a Dutch navigator, after whom it was named.

Jannes (jän'nēs), and **Jambres** (jäm'brēs), two magicians in Pharaoh's court, who, according to St. Paul, "withstood Moses," or attempted to imitate the miracles of Moses; believed to have been the sons of Balaam.

Jansen (yän'sĕn), or **Janse'nius, Cornelius**, 1585–1638; Dutch theologian; founder of the sect of Jansenists; b. Acquoi; became head of a college at Bayonne; principal of a college at Louvain, 1617, and Prof. of Scriptural Interpretation there, 1630, and 1621, the chief exponent of a system of doctrine which, after his death, received the name of Jansenism; but during his life was chiefly remarkable for polemics and contests with the Jesuits; published, 1635, "Mars Gallicus" in defense of the rights of Spain against France in the then impending war; was rewarded with the Bishopric of Ypres, W. Flanders, at which place he died of the plague; best known work, an exposition of the doctrine of St. Augustine on grace, free will, and predestination.

Jan'senism, heresy which consisted in denying the freedom of the will and the possibility on the part of man of resisting grace. The leaders in this heresy had also from the beginning for their object to restore ancient doctrines and discipline from which they considered that the Church of their day had elapsed. They were to do this reforming not by separating from the Church, but by remaining within her. They appealed more to tradition, especially St. Augustine, than to Scripture. They called themselves Catholics and rejected the name Jansenist, protesting that Jansenism was a bugbear invented by their foes to trouble consciences and calumniate pious Catholics.

The famous book of Jansen, called the "Augustinus," was condemned by the Roman Inquisition, 1641, and in the following year by Urban VIII, as renewing the errors of Baius. Some Flemish bishops and the Univ. of Louvain questioned the authenticity of the bull of Urban VIII, and resisted its publication. The Sorbonne of Paris and the King of France stood out for its authenticity and took sides with the papal authority. The Disciples of St. Augustine, as the friends of Jansen styled themselves, were numerous and strong; they had brilliant leaders, chief among them Antoine Arnauld; Port Royal was one of their strongholds. Another bull against Jansenism was issued by Innocent X, 1653, and proscriptions were made by other popes; nevertheless, Jansenistic works, notably the "Moral Reflections" of Quesnel, had a large circulation in France in spite of papal proscriptions against the book.

Information having been given to Rome that the heresy was still strong and spreading rapidly, the bull "Unigenitus" was issued, 1713, condemning 101 propositions from the works of Quesnel. A few years later some French bishops gave notice that they appealed against the "Unigenitus" to a future council. These Appellants, as they were called, were supported by some minor universities, some members of the hierarchy, and the regent of the kingdom during the minority of Louis XV. When Louis came to the throne he took sides against the Jansenistic sect and enforced the papal decisions. This action of the young king ended the existence of Jansenism as a sect in France, though scattered adherents to its doctrines may have been found even in the beginning of the nineteenth century. In Holland it remains as a schismatic church. The Archbishop of Utrecht is the head of it and rules over some twenty-five congregations. Since 1870 he has received as recruits the Old Catholics of Germany and Charles Loyson (Père Hyacinthe) of France.

Janssen (yäns'sĕn), **Johannes**, 1829–91; German historian; b. Xanten, Prussia; became Prof. of History in the gymnasium at Frankfort on the Main, 1854, and by his "History of the German People from the Close of the Middle Ages to the Beginning of the Thirty Years' War" attained instant and great popularity among German Roman Catholics. His history

was accepted on both sides as the Ultramontane answer to the Protestant attacks on the Roman Church of the sixteenth century.

Janssens, Abraham, abt. 1569–1631; Flemish painter; b. Antwerp; two principal works, the "Virgin and Child" and the "Deposition from the Cross," are in the Carmelite Church at Antwerp. The "Resurrection of Lazarus," in the Elector Palatine's Gallery, is also remarkable.

Janssens, Francis, 1847–97; American prelate; b. Tilburg, Holland; ordained in the Roman Catholic Church, 1867; went to Richmond, Va., 1868, where he was first assistant and rector in the Cathedral of St. Peter, secretary and chancellor of the diocese, and vicar general; appointed Bishop of Natchez, 1881, and Archbishop of New Orleans, 1888.

Janua'rius, Saint, 272–305; Christian martyr; b. Naples or Benevento; was made Bishop of Benevento abt. 303, and during the persecution by Diocletian was beheaded as a martyr at Pozzuoli. Two phials filled with his blood were preserved, and the body was ultimately taken to Naples, where these relics are still shown in the Church of Santa Chiara. St. Januarius is the patron saint of Naples. On his anniversary, September 19th, the relics are brought out, when the blood in the phials suddenly becomes liquid and bubbles up. This is esteemed a miracle by the populace, and claimed as such by the clergy, though it has never been formally sanctioned by the Church.

Jan'uary, first month of the year in the Gregorian calendar; according to Roman tradition, first added to the calendar by Numa, together with February. It had originally twenty-nine days, to which two more were added by Julius Cæsar when he reformed the computation of time. It corresponded in the Greek calendar to the latter half of Poseideon and the first half of Gamelion; was known by the Scandinavians as the month of Thor, and in the French Revolutionary calendar it formed part of Nivose and Pluviose. In England, January was made the first month of the year by act of Parliament, 1751.

Ja'nus, one of the most ancient gods of the Italic peoples; was regarded as the god of the doorway (*ianua*), and hence as a patron of all entrances, beginnings, etc.; is most commonly represented, on coins and elsewhere, with two bearded faces, making but a single head, looking in opposite directions. In other representations he appears as a porter or gatekeeper, with staff and key. As a god of war he occupied a temple on the N. side of the Forum, near the Curia, the double doors of which were kept open in time of war and closed again in time of peace.

Japan', empire in Asia; consists of five principal islands and a great number of smaller ones, between the parallels of 24° and 51° N. lat., and included within 33½ E. lon. (123° to 156½°); territory of Japan proper, excluding the Kuril Islands in the N. and Riu Kiu and Bonin Islands in the S., all of recent acquisition, and even the Island of Yezo (officially Hokkaido), stretches between 30° and 41½° N. lat. and 128° and 142° E. lon., and consists of three large islands—Hondo or Honshiu (the main island), separated from the continent by the Sea of Japan; Shikoku and Kiushu; with Tsushima and other adjacent islands. Japan is separated from Korea by the Korea Strait, divided by the Tsushima Islands into Broughton Channel and Krusentern Strait; and from Russia by the Soya or La Pérouse Strait at the N. of Yezo; is bounded on the E. and SE. by the Pacific Ocean; area (including Pescadores, but excluding Formosa and Sakhalin) 146,513 sq. m.; pop. (1907) 49,319,000; capital, Tokyo (formerly Yedo). The native pronunciation of the Chinese name *Jih-pen* is *Nihon*, or *Nippon*, to which *Dai* (great) is usually prefixed by the Japanese when they speak of their country. The native name until 700 A.D. was *Yamato*, from the province close to Kyoto where the early emperors ruled, hence the term *Yamato-Damashii*, spirit of old Japan, which to-day is used to signify the ideal of the Japanese national spirit. *O mi-kuni*, or Great August Country, and *Kami-no-kuni*, the land of the gods, are names also popular in the native literature.

Japan has few plains of any extent, and consists of numerous ranges of high hills, extending as a rule from SW. to NE. A long chain of high mountains stretches down the center of the main island, culminating in the magnificent peak of Fujiyama, 12,365 ft. The most considerable range is to be found to the NW. of Fujiyama in the provinces of Hida and Etchu; extends almost due N. and S. for 65 m., is frequently called the Japanese Alps, and has as its highest peak Yari-ga-take, 10,000 ft. In the Shinsu range is the active volcano Asama-Yama, 8,282 ft. The three great rivers are the Shinanogawa, entering the Sea of Japan at Niigata; the Tonegawa, entering the Bay of Tokyo, and the Kisogawa, which enters the Bay of Owari; all largely used for inland navigation. The NW. and E. coasts have scarcely a good harbor available for commercial purposes, exceptions being the Bay of Sendai, on the E. coast, and that of Awomori, at the extreme S.

The Inland Sea, lying between the SW. coast of the main island and the N. coasts of Kiushu and Shikoku, is completely landlocked, and favors internal navigation, although the bottom is so shallow as to make navigation difficult for ocean steamers. Shikoku has one important harbor, Kochi, although this has a sandbar; Kiushu possesses the fine bays, among others, of Omura, Nagasaki, Shimabara, and Kagoshima, affording excellent anchorages. Yezo has two excellent harbors, Hakodate and Mororan. The chief lakes are Omi or Biwa-ko, close to Kyoto, 37 m. in length; the mountain lake Inawashiro and Chusenji, near Nikko, much visited for its beauty, and Hakone, between Tokyo and Kyoto, a summer resort for foreigners. The numerous islands include 888 in the Bay of Sendai, known as Matsushima, and famed for the beauty of their scenery.

Coal is largely worked on the N. coast of Kiushu (Nagasaki, Karatsu) and in Yezo (Poronai). There are extensive copper mines, several silver and gold mines, and there is a considerable production of antimony, chiefly in

Shikoku, whence come the famous antimonite crystals. Other mineral products include sulphur, petroleum, iron, lead, pyrites, manganese, salt, graphite, granite, obsidian, freestone, malachite, agates, carnelians, and jasper of great size and beauty, which are obtained in almost every province; pearls are fished along the coast. The flora of Japan corresponds more closely to that of the American than to that of the Asiatic continent. Evergreen plants predominate, the characteristic tree being the graceful matou or pine. The bamboo and camphor laurel flourish in the valleys. The cryptomeria lines some of the principal roadways and furnishes a soft wood; there are other conifers. More durable timber comes from the Japanese elm and other trees. Favorite flowers are the azalea, tree peony, wistaria, lotus, and chrysanthemum. The camellia is considered unlucky. Among blossoms the cherry holds the first place, and whole avenues of flowering trees give the country a smiling appearance in April. The plum blossom flowers in February; the peach blossom, flowering about the same time, is least esteemed of the three. Hydrangeas flourish on the hillsides, and abound in Yezo.

The climate is somewhat extreme. The W. coast is affected by the proximity to Siberia, and its winters are harsh. On the whole, the climate is salubrious, though damp and, in the plains, enervating. N. winds prevail in winter; S. in summer. The yearly rainfall at Tokyo is 58.33 in. The late autumn is usually dry, and the atmosphere is then beautifully clear. Snow rarely lies more than 5 in. deep at Tokyo, the climate of the SE. being modified by the Kuro Sivo or Black Current. The soil is not, as a rule, very fertile. There is an admirable system of field irrigation, and all the sewage of the towns and cities is used for fertilizing. About three fifths of the arable land is cultivated by peasant proprietors and the remaining portion of it by tenants. The chief crops raised are rice, barley, beans, millet, wheat, rye, buckwheat, potatoes of various kinds, radishes, tea, and tobacco. Considerable sugar is produced, and silk culture is a very important industry. Oxen and cows were used in central Japan for draft purposes only, but during the present era many dairies have sprung into existence. Pork has become a favorite article of diet, and pigs are commonly raised, but not privately. Sheep do not thrive on Japanese grasses; goats and donkeys are not often seen. The horse, used to some extent in agricultural districts, is small and scraggy; it was introduced in the third century of our era.

The leading manufactures are those of silk, cotton, and other textiles. Kyoto and the districts immediately to the N. of Tokyo are centers for silk manufacture. At Wakamatsu the government has a large foundry for turning out pig iron, Siemens' steel, and rails and plates. At Nagasaki are important building works. Japan is famed for its swords, its bronze work, especially its bells, lanterns, and vases, and its lacquered ware, porcelain, and pottery. Inflammable substances, Japanese and European paper, leather, oil, matting, fans, baskets, cheap bric-a-brac, and lucifer matches are also largely manufactured. Foreign commerce is carried on through the open ports of Yokohama, Kobé, Osaka, Nagasaki, Niigata, Hakodate, and twenty-four special export ports; chief exports, raw silk, silk manufactures, cotton yarn, cotton manufactures, coal, copper, tea, matches, earthenware, camphor; value imports (1907), excluding Sakhalin, $232,680,000; exports, $201,990,000; countries from which the largest amounts of articles are imported, Great Britain, U. S., British India, China, and Germany; principal countries importing from Japan, U. S., China, France, Hong Kong, Korea, and Great Britain. The length of railways (1908) was 4,899 m., of which 4,453 were owned by the state.

The government is an hereditary monarchy, the succession being in the male line. By the constitution promulgated 1889 the emperor (the term "mikado" is obsolete) exercises the whole of the executive powers, with the advice and assistance of ten ministers who are responsible to him and appointed by him. There is also a privy council, an advisory body which is consulted by the emperor on all important state matters. The Imperial Diet consists of a House of Peers of about 370 members, partly elective, and a House of Representatives of 379 members, elected for four years, by secret ballot, by male citizens over twenty-five years of age, paying land taxes of not less than ten yen per annum, who have resided in their districts for one year at least. Exclusive of Formosa, Japan is now divided for administrative purposes into forty-seven prefectures, over each of which is a governor appointed by the central authority. First come the three city prefectures (*fu*) of Tokyo, Kyoto, and Osaka. The county prefectures are called *ken*. There is also (excluding Formosa) a division into 85 provinces, 63 municipalities, and 637 counties, 1,150 towns, and 11,545 villages (1907). The cities having over 100,000 pop. (1903) were Tokyo, Osaka, Kyoto, Yokohama, Nagoya, Kobé, Hiroshima, and Sendai.

Service in the army (or navy) is universal and compulsory. Liability commences at the age of seventeen and extends to the age of forty, but actual service begins at twenty. The army consists of the active or first line (*Geneki*), the reserve (*Yobi*), the second line (*Kobi*), corresponding to the German *Landwehr*, and the territorial or home defense army (*Kokumin*), corresponding to the German *Landsturm*. The peace strength is about 220,000; the field army amounts to from about 600,000 to 800,000 men. Abroad there is the separate garrison of Formosa, and also some 35,000 to 40,000 troops in Korea and Manchuria. The strength of the navy in ships built and building (1908) was 339, including 17 battleships of the first class, 19 armored cruisers, 19 protected cruisers, and 180 torpedo vessels, torpedo-boat destroyers, and torpedo boats.

The Japanese are a mixed race, and several elements are noticeable in the physiognomy of different classes. The people of the S. approach more to the Malay type, of the center to the Korean type, while N. of Tokyo the

common folk have broad faces and large eyes, and are altogether less Mongoloid. Though each rank is definitely defined, a subject may rise from one into the other, and promotion is open to the lowest. After the nobles, who in 1903 numbered 5,055, come the *samurai* or *shizoku* class, the gentlemen retainers of feudal times, numbering about 2,167,390 individuals, brave, spirited, quick to resent insult, and progressive. The mass of the people (*heimin*) are easy going, indifferent, and submissive.

There is absolute freedom of religious belief and practice. The chief forms of religion are Shintoism, the original religion of the country; Buddhism, which gradually supplanted or absorbed Shintoism, and in the ninth century was the predominant religion, and though disestablished, 1871, is still professed by the middle and lower classes. The upper classes are mostly pure agnostics. In 1903 there were 1,142 churches and preaching stations of the Roman Catholic, Greek, and Protestant churches. Shrines dedicated to eminent ancestors of the Imperial House are independent of any sect; some are supported by state or local authorities.

Education in Japan is nominally compulsory and certainly widespread. There is a local system of elementary, middle, and normal schools, crowned by the imperial universities in Tokyo and Kyoto, with their feeders or higher middle schools, and the Higher Normal School at Tokyo. There are also agricultural, technical, and commercial colleges in the capital and the provinces, a music conservatory connected with the Higher Normal School, a ladies' institute for the higher learning, and many similiar institutions.

Two armies of invaders seem to have entered the islands at an early period, and traces of their conflicts with "hairy barbarians" (Ainos) still remain. The Japanese use the date of the Emperor Jimmu's accession (660 B.C.) as the starting point of their history. Buddhism was introduced from Korea abt. 552. The Empress Jingo, who began to govern Japan as regent 201 A.D., opened up relations with China, and exacted tribute from the three kings of Korea. The centuries following 600 A.D. were a period of assimilation of everything Chinese, and the centralized system of officialdom imported from China made the emperor the absolute "Son of Heaven." Before the thirteenth century a military caste arose, and a struggle occurred between the families of Taira and Minamoto, Yoritomo of the latter clan obtaining the mastery, and being appointed, 1185, *Shogun* or generalissimo, an office that was not abolished till 1868. The Shoguns became puppets, their vassals, the Hojo lords, exercising sway, 1205–1333. In the thirteenth century a Mongol invasion under Kublai Khan was successfully repulsed. For sixty years, until 1392, there were two rival dynasties of emperors, the N., supported by the Ashikoga family, finally proving successful. The Ashikoga rule continued until 1573, and was a period of high art and culture. In 1542 the Portuguese entered Japan, introducing firearms and the Roman Catholic religion, which, in spite of persecutions and massacres of native Christians, was not rooted out until a century later.

After a long period of anarchy, Hideyoshi, an able general, restored unity and order to the state, while Iyeyasu, his successor, conquered the turbulent territorial nobles. Iyeyasu's family, the Tokugawas, became hereditary in the office, and were *de facto* rulers of Japan. Under the third Tokugawa, called Iyemitsu, a policy of isolation was enforced, the Dutch alone, at Nagasaki, being granted certain very restricted privileges of trading, and the Portuguese, 1638, being expelled. In 1854 Commodore Perry forced a treaty with the U. S., and the opening of the ports of Shimoda and Hakodate. Treaties with other nations followed, all of which excited indignation against the Tokugawa *régime*, which was, in fact, the domination of the N. over the S.

The long-dissatisfied men of Satsuma, Choshu, and Tosa now offered to aid the emperor against foreign aggression if the detested shogunate at Yedo were abolished. After a short war the shogunate was overthrown. A secret visit to London by two members of the Choshu clan, who reported that Japan must have ships, cannon, railways, and other civilized appliances to be great, led to the complete abandonment of the old seclusion and the transference of the court from Kyoto to Yedo, now Tokyo, and the native suppression of the feudal system, 1871. The Satsuma rebellion, 1877, "against his imperial majesty's evil advisers" ended disastrously for its leader, but helped to exhaust the national treasury. A dispute with China terminated in the annexation of the Loochoo Islands, 1879.

In 1881 a parliament was promised to the people. In 1884 orders of nobility were created after the European fashion, rank being conferred not only on the old territorial nobility, but also on the new men of the restoration of 1868. Then followed the initiatory of the imperialism of Germany with its cheap and efficient military system, economical civil list, and arrogant court. A reaction was inevitable, the mass of the people having become disgusted with foreign ways, and the first parliament, convoked 1891, was dismissed for its antagonism to the government, while the second was suspended for contumacy. A treaty with Korea was effected, 1876, and Japan's protest against the suzerainty of China was one of the causes of war with that country, 1894–95, by which Japan obtained Formosa, enhanced the prestige of her army and navy, and became a "great power."

The failure of Russia to withdraw from Manchuria despite her treaty with China and her aggressive action in Korean territory threatened the independence of the latter country and the safety of Japan. After various proposals and counter proposals by the two countries, Japan, in January, 1904, made final proposals, which included the recognition of Korea and its littoral as being outside the Russian sphere of interest, the respecting of the territorial integrity of China in Manchuria, and the recognition of the treaty rights of Japan and other powers within the limits of Manchuria. The delay of Russia in replying caused Japan to

take aggressive action. The Russian fleet outside Port Arthur was attacked by the Japanese fleet, February 8th; war was formally declared, February 11th; the Japanese invaded Korea, forced the passage of the Yalu River, and entered Manchuria, and in series of bloody battles defeated the Russians, captured Port Arthur after a long siege, January 7, 1905, and in the final battle of Mukden, March 10th, lost 52,500 men, but took about 50,000 prisoners, and caused the Russians a loss of 30,000 killed and 100,000 wounded. Meanwhile the navy had won brilliant victories, practically destroying the Russian fleets. Through the offices of Pres. Roosevelt peace was brought about, and by the treaty, signed at Portsmouth, N. H., September 5, 1905, Russia ceded the lease of Port Arthur, Ta-lien, and adjacent territory and waters; also the S. half of the island of Sakhalin, the railway between Chan-Chun and the coal mines worked in connection therewith, and agreed to recognize Japan's paramount political, military, and economical interests in Korea. By a treaty with Korea, 1905, Japan obtained the control and direction of the external relations and affairs of that country, and became represented at the capital, Seoul, by a resident general. In 1907, owing to the forced abdication of the emperor and consequent disturbances, Japan assumed complete control of the internal administration of Korea and appointed Japanese officers of the Korean Govt.

Japan, Sea of, portion of the Pacific Ocean, having the islands of Japan on the E. and Manchuria and Korea on the W. In its narrowest part are the Tsu-Shima Islands, where it broadens are the Liancourt Rocks, and to the S. of Korea is the island of Quelpart. It was at the Tsu-Shima Islands that the Japanese fleet, emerged from hiding, headed off the Russian fleet under Rojestvensky and practically annihilated the Russian ships, May 27 8, 1905.

Japan Clo'ver, popular name of a species of Lespedeza (*L. striata*), a low annual, growing

JAPAN CLOVER.

to a height of little over a foot on the poorest soils; is a native of China and Japan; was in some unknown manner introduced into the S. parts of the U. S. before 1845; is readily eaten by cattle, and has become popular with stock raisers.

Japan'ning, varnishing with any of the peculiar hard varnishes called japan, japan varnish, black japan, japan lacquer, japan black, Brunswick black. The name japanning is given to the art, to the trade, and to the finished work. Although the term comes from the attempted or supposed imitation of Japanese lacquer, the work and its processes are wholly different from any which have originated in Japan. See VARNISH.

Ja'pheth, one of the three sons of Noah, mentioned last in order, but held by critics to have been the eldest—one of the eight persons preserved in the ark, and the progenitor to whom is ascribed the peopling of the N. portion of Asia Minor, and perhaps Thrace. Most of the nations of Europe are usually deduced from Japheth, who is supposed to be identical with the Greek Iapetus, the father of Prometheus.

Japurá (zhä-pō'rä). See YAPURÁ.

Jardine (jär'dĭn), **Sir William,** 1800–74; Scottish ornithologist; b. Applegarth, Dumfriesshire; gave his attention chiefly to ornithology, though a voluminous writer on all the vertebrate animals; edited White's "Natural History of Selborne" three times; established the *Magazine of Zoölogy and Botany*; assisted in conducting the "Annals of Natural History" and the "Philosophical Journal," besides publishing a "Calendar of Ornithology."

Jarnac (zhär-näk'), town in department of Charente, France; 16 m. NW. from Angoulême; has an active trade in wine and brandy. A battle was fought here, March 13, 1569, between the Huguenots, under the Prince of Condé, and the Roman Catholics, under the Duke of Anjou, afterwards Henry III, in which the former were defeated and Condé lost his life. Pop. abt. 4,500.

Jaroslav (yä'rō-slăv). See YAROSLAV.

Jar'row, or Yar'row, town in Durham Co., England; on the Tyne; 7 m. E. of Newcastle; has extensive shipbuilding yards, foundries, blast furnaces, and marine-engine works, manufactures of chemicals and paper, and, in the neighborhood, large collieries. Pop. (1901) 34,295.

Jarves (jär'vēs), **James Jackson,** 1818–88; American writer; b. Boston, Mass.; resided for some years at Honolulu; 1848, was sent as Hawaiian special commissioner to Washington, London, and Paris to negotiate commercial treaties; remained in Europe, residing chiefly in Paris and Florence, and later in Rome, studying art and forming the gallery of old masters which subsequently became the property of Yale College; wrote several books, including "History of the Hawaiian Islands," "Art Hints," "Art Studies," "The Art Idea," "Art Thoughts," "The Art of Japan."

Ja'sher, Book of, Hebrew work twice cited in the Old Testament (Josh. x, 13, and II

Sam. i, 18), but no longer extant. One citation is the well-known apostrophe of Joshua to the sun and moon, the other the beautiful elegy of David on Saul and Jonathan. The Hebrew name, "Sepher Hayashar," is interpreted to mean "Book of the Just."

Jasmin (zhäs-măṅ'), **Jacques** (in Provençal, JACQUON JAUSEMIN), 1798–1864; French poet, sometimes called "the last of the troubadours"; b. Agen, Lot-et-Garonne; was the son of a poor tailor; entered a seminary for the priesthood, 1810, but was expelled for some misconduct; was apprenticed to a barber; at eighteen established himself as a hairdresser, and for many years did not abandon his craft; was made a Chevalier of the Legion of Honor, 1846, and given the extraordinary prize of 5,000 f. by the French Academy, 1852; works include "The Curl-papers of Jasmin," "The Charivari," and "The Blind Girl of Castel Cuille," translated by Longfellow. To his example and success was chiefly due the remarkable revival of poetry in the dialect of S. France in the nineteenth century.

Jasmine (jăs'mĭn), or **Jes'samine,** common name for species of *Jasminum*, a genus of erect or climbing shrubby plants belonging to the natural order *Oleaceæ*, with regular gamopetalous flowers distinguished by having stamens fewer than the lobes of the corolla. The common species are the white jasmine or jessamine and the yellow jasmine, and in conservatories an Indian species (*J. sambac*), which

JASMINUM OFFICINALE.

exhales a powerful fragrance at evening. One of the most remarkable varieties is the Spanish or Catalonian jasmine. The flowers are larger, of a reddish hue, and still more odoriferous. It grows wild on the island of Tobago, but is cultivated in N. Spain and S. France, especially at Cannes and Grasse, where the aroma is extracted by a process called *enfleurage*. The name Cape jasmine is popularly applied to a species of gardenia, family *Cinchonaceæ*. The so-called yellow jasmine of the U. S. is a twining plant (*Gelsemium sempervirens*, family *Loganiaceæ*), growing in rich, damp soil in the coast districts from Virginia to Florida and Texas. It is a beautiful plant, with large, deep-yellow, sweet-smelling flowers, and climbs trees in the S. forests.

Ja'son, in Greek mythology, son of Æson and Alcimede. When grown to manhood he demanded of his uncle Pelias the Kingdom of Iolcus, in Thessaly, of which his father had been defrauded. Pelias agreed to surrender it in exchange for the golden fleece of the ram which had borne away to Colchis Phrixus and Helle. Aided by Athene, Jason built the ship *Argo*, and with his companions (see Argonautæ) finally arrived in Asia. Æetes, King of Colchis, promised to give up the fleece provided Jason would yoke the fire-breathing cattle of Hephæstus, plow a plot of ground, sow therein the dragon's teeth given to Æetes by Athene, and slay the armed men that should spring from the ground. With the help of Medea, daughter of Æetes, Jason performed the tasks, but the king refused to keep his promise, whereupon Medea drugged the dragon, enabling the hero to bear away the fleece, and then fled with the man she loved. Jason ascended the throne, Medea having compassed the death of Pelias, but his reign was short, Acastus, the son of Pelias, driving him out. The guilty couple repaired to Corinth, where, ten years later, Jason forsook Medea for Creüsa, daughter of King Creon. Medea avenged herself by sending a poisoned mantle to Creüsa, which caused her death, and by slaying her own children. Jason finally took his own life.

Jason, d. 370 B.C.; Tyrant of Pheræ, Thessaly; probably the son of Lycophron; came into power abt. 395 B.C., and undertook to reduce all Thessaly to his dominion. In 375 B.C. he had succeeded in conquering all the cities except Pharsalus, which was supported by Sparta. Soon afterward he was chosen dictator of Thessaly, took a prominent part in the wars between the states of Greece, and would probably have anticipated the career of Philip of Macedon had he not been assassinated.

Jas'per, William, 1750–79; American military officer; b. S. Carolina; enlisted in the Second S. Carolina Regiment at the beginning of the Revolutionary War; became a sergeant, and distinguished himself in the defense of Fort Moultrie against the British fleet, June 28, 1776, by leaping through an embrasure under a galling cannonade to recover the flag of the state. In the assault on Savannah, October 9, 1779, Jasper accompanied d'Estaing and Lincoln in their attack on the Spring Hill redoubt, and was killed while attempting to fasten to the parapet the colors of his regiment.

Jasper, general name for the opaque noncrystalline varieties of quartz or silica, the translucent to semitransparent varieties being called chalcedony. It is abundant, forming veins and even rock masses, and often occurring as rolled pebbles. It is opaque, and more or less impure from the presence of oxides of iron, which impart to it a variety of colors, often mingled in spots, clouds, or stripes. From these, and its hardness, and the fine pol-

ish which it takes, jasper has long been a favorite stone for ornamental purposes of almost every kind. Red and green are the finest colors; it is also frequently brown, yellow, and black, occasionally white, pink, or bluish. The largest mines of jasper are in the upper Ural Mountains and in Siberia, especially the Kalkan Mountains, where it is quarried in enormous blocks. It took twenty-five years to cut a single vase now at the Winter Palace in St. Petersburg. Jasper was highly prized by the ancients, and is frequently alluded to in the Scriptures; but as it is spoken of as clear, evidently some other stone was meant, doubtless rock crystal. Jasperized wood is wood that has been naturally replaced by deposits of silica colored by metallic oxides, while retaining the ligneous structure and form. It is an elegant ornamental stone, and occurs in the U. S. at various localities W. of the Rocky Mountains, notably in Arizona and New Mexico.

Jassy (yä'sē), chief town of Moldavia, Roumania; on the Bachlui, a tributary of the Pruth; 205 m. NW. of Odessa; has a university, schools of various grades, a museum with a public library, and a theater. Its trade in grain and wine is important. In 1861 the seat of government was removed from Jassy to Bucharest. Pop. (1900) 78,067.

Jasz-Bereny (yäs-bā-rānī'), town in the district of Jazygia, Hungary; on both sides of the Zagyva; 39 m. E. of Budapest; has a Franciscan monastery, a Roman Catholic gymnasium, a high school, and a beautiful town hall; also a considerable trade in corn, cattle, and wine. In the middle of the city stands a monument said to mark the burial place of Attila. The people of the town and vicinity are extensively engaged in raising horses, cattle, and sheep. Pop. (1900) 22,000.

Jativa (hä'tē-vä), or **San Felipe de Jativa** (sän fā-lē'pā dā —), anc. *Setabis* or *Sætabis*, town in the province of Valencia, Spain; on the Albalda, a tributary of the Jucar; 35 m. SSW. of Valencia; is a handsome and well-built town, with several monuments built in the times of the Moors; was formerly fortified, and has been besieged successively by the Moors, Jacme I of Aragonia, Charles V and Philip V. It was the birthplace of Ribera.

Jats (jäts), people of India, forming about half of the population of the Punjab and Rajputana, and very numerous in the united provinces of Agra and Oudh, Sind and Baluchistan. Jat settlements have also occurred on the shores of the Persian Gulf, in Antioch (ninth century), and in the Chaldean marshes, from which they were deported, 834. Their traditions point to an immigration from Afghanistan, and they may have been the ancient Getæ. The Jataki or Jat language is a variety of Sindi, and a pure Sanskrit tongue, with peculiar early grammatical forms. Though very tenacious of their language, they vary in their religion, being Brahman, Sikh, or Mohammedan, according to locality. They are divided into numerous tribes, occasionally become migratory in bands or individually, are harmless and industrious, though formerly warlike, and have a great store of popular songs and traditions.

Jaundice (jän'dis), or **Ic'terus**, greenish-yellow color of the skin, produced by the presence of the coloring matter of the bile in the blood. It is not a disease, but a symptom of disease of the liver, due to its incapacity to secrete bile or to obstruction of the bile ducts, which prevents the bile from flowing into the intestines. This latter may be due to tumors, gallstones, etc. Jaundice, especially in infants, is sometimes due to destruction of the blood when the pigment is deposited in the tissues. Such jaundice is also seen in infectious diseases like yellow fever, and in poisoning. Severe unpleasant emotion may produce a temporary jaundice. A jaundiced person should not eat fats, constipation should be avoided, and liver sluggishness overcome by calomel.

Jaunpur (jown-pōr'), town in the district of Jaunpur, British India; on the Gumti River; 60 m. NW. of Benares. The citadel incloses several fine monuments of the fourteenth and fifteenth centuries, and the river is spanned by a beautiful bridge of ten arches, built in the sixteenth century. Pop. (1901) 42,771.

Jaurès (zhō-rā'), **Jean**, 1859– ; French Socialist; b. Castres, Taru; was Prof. of Philosophy at Albi and Toulouse; elected to Chamber of Deputies, 1885; became editor of *La Petite Republique*, and general director of "L'Histoire Socialiste," a work by several authors, planned for fifteen volumes; was conspicuous in the defense of Alfred Dreyfus; undertook to reunite the groups of French Socialists; was officially debarred from delivering a speech in Berlin, 1905; publications include "Les preuves," "Action socialiste," "Études socialistes."

Java (jä'vä), one of the largest of the E. Indian islands, and the richest of the Dutch colonial possessions; about 600 m. long by 125 broad at the broadest part; lying nearly E. and W., with the Indian Ocean to the S. and the Java Sea to the N.; separated from Sumatra by the narrow Sunda Straits, and from Bali on the E. by the still narrower Straits of Bali; with Madura and some small islands, has area of 50,554 sq. m.; pop. (1905) 30,098,008; capital, Batavia; other chief towns, Samarang and Surabaya. A series of volcanoes extend alone the axis of the island, forming a single row along the center and clustering toward the E. and W. end, culminating in the volcano Semera in the E. (12,290 ft.). The number of known volcanoes is forty-five, according to Junghuhn; of these, fourteen are found near the W. end of the island in a space not more than 35 m. long by 20 broad. The volcanoes are not generally in active eruption, though most of them continuously send up smoke or noxious gases. Earthquakes are frequent, but are not usually severe. Junghuhn has published a list of 143, of which 3 preceded volcanic eruptions, 19 accompanied, and 2 followed them, while 119 were independent of them. An earthquake, 1867, was very destructive, and, 1883, the earthquake and tidal wave which accompanied the eruption of

Krakatoa destroyed about 50,000 people in W. Java.

Java is abundantly watered. The rivers are for the most part on the N. side. The largest stream is the Solo, which rises on the volcano Merapi, near the center of the island, and flowing first N. and passing the city of Surakarta, then W., empties into Madura Strait after a course of 175 m.; it is navigable for large boats, except from August to October. The shores on the N. side are usually shallow, the coast low, and seldom protected by islets. There is only one good port on this side, Surabaya. The S. coast is abrupt, with very few islands. The Bay of Batavia near the NW. angle is capacious, and is somewhat protected from winds by a series of outlying islands, but it rapidly shallows near the coast, and large vessels lie out a mile or two from shore. The largest island on the coasts is Madura, near the NE. angle, 135 m. long by 50 broad, forming a distinct province. Java is subject to the monsoons, the wind being from the SW. from December to March, and from the NE. from May to September. The rainy season lasts from October to March, and during January and February the rains are often torrential, though of short duration. The dry season is from April to September, and it is driest in August. The total annual rainfall is about 80 in. The mean temperature (at Batavia) is 77° F., and the extreme range, 26°.

The wealth of vegetation in the hot zone is amazing, and the fertility of the soil fairly incredible. Here are successfully raised all the products of the tropics. In the temperate zone the forests are more extensive and the trees larger. Tobacco is raised with especial success. Tea has been planted, but does not prove to be as good as the Chinese article. Coffee is extensively cultivated, and in this and the next higher zone the cinchona from Bolivia has been planted, and thrives. The cool zone has forests of oaks, chestnuts, and laurels, along with which are seen the flowers of azaleas and rhododendrons. In the cold zone the teak is a characteristic tree, while the chief vegetable productions are rice, maize, sugar cane, tobacco, indigo, cotton, coffee, and tea. The poisonous upas has long been celebrated, and includes two different trees, one of which produces strychnine; the other is the *Antiaris toxicaria*, the dried sap of which is used by the natives to poison arrows.

The Javanese proper are of good size and well made, very short armed, deep brown in color, but lighter on the mountains; the nose is small and less flat than among the Malays, the face elongated; the eye black, large, deep, and slightly oblique; beard slight. The Sundanese are shorter, more muscular, and more independent, with lighter skin and coarser features. The Javanese language is very rich and expressive, interspersed with many foreign words. There are two forms, one for addressing an inferior, the other for a superior. The literature is a considerable one, and consists of romances, chronicles, poems, moral and legal treatises, and translations from the Sanskrit and Arabic. In religion the Javanese are generally Mohammedans. They were formerly Brahmans and Buddhists, but still retain elements foreign to all these religions, probably traces of their own original form of faith. The Christian missions have not been very successful in the islands. For administrative purposes Java, including the neighboring island of Madura, is divided into seventeen residencies, each governed by a resident and subordinates under the Governor General of the Dutch E. Indies. Excepting in the W., land is government property, and is let on hereditary lease to individuals or to villagers. Most of the coffee plantations are under government management. A railway extends nearly the entire length of the island, crossing from Batavia to near the middle of the S. coast, then recrossing to Samarang, Surabaya, and other ports on the Madura Straits.

Java Deer, popular name for the chevrotains or pygmy musk deer of the genus *Tragulus*, applied to these little creatures from the fact that they are often brought from Java, although found in other islands of the Malay Archipelago and parts of S. Asia.

Javary (zhä-vä-rē'). See YAVARI.

Ja'va Spar'row, or Rice'bird, popular name of one of the largest of the Asiatic finches, abundant in S. Asia, Java, and Sumatra; is of a delicate gray, with conspicuous white patches on the cheeks, and a black tail; name was given to the bird because it was first taken to Europe by vessels touching at Java.

Jave'lin, short, heavy spear used for throwing with the hand at an enemy. The Roman *pilum* was essentially a javelin, about 5½ ft. long; consisted of a hardwood shaft and barbed iron or steel head; and was one of the most formidable of the offensive weapons of those times.

ROMAN JAVELINS.

Jaxartes (jăks-är'tēz). See SYR-DARIA.

Jay, John, 1745–1829; American jurist and diplomatist; b. New York City; admitted to the bar, 1768; member of Continental Congress, 1774–77 and 1778–79; aided in drafting the New York State Constitution; appointed Chief Justice of New York, May, 1777; resigned, December, 1778, to become president of Congress; appointed minister to Spain, 1779, and one of the ministers to negotiate peace with Great Britain, 1781; signed the Treaty of Paris; appointed one of the ministers to negotiate treaties with the European powers, 1783; became Secretary of Foreign Affairs, 1784, and Chief Justice U. S. Supreme Court, 1789; was defeated as Federal candidate for Governor of New York by George Clinton, Democrat, 1792; minister to Great Britain, 1794–95; Governor

of New York, 1795–1801; declined reëlection and also reappointment as Chief Justice U. S. Supreme Court, and retired to private life. While minister to Great Britain he signed (November 19, 1794) the instrument known as Jay's Treaty.

Jay, common name for a number of moderate-sized birds of the crow family, forming the subfamily *Garrulinæ*. They have short, rounded wings and long, rounded tails; the plumage is usually soft and lax, often brightly colored,

BLUE JAY.

and conspicuous crests are frequently present. The blue jay of the U. S. (*Cyanocitta cristata*) has a brilliant plumage of blue, with white and black markings. Jays are found throughout the greater portion of the N. hemisphere, in N. Africa, and in S. S. America.

Jay's Trea'ty, treaty between Great Britain and the U. S., signed November 19, 1794, by John Jay, then U. S. minister to Great Britain. By its provisions the E. boundary of Maine was determined; U. S. citizens recovered above $10,000,000 for illegal captures by British cruisers, and the W. posts held by British garrisons were surrendered. But in consequence of the exclusion of U. S. vessels from Canadian ports, the restrictions placed upon the W. Indian trade, and the absence of any provision respecting impressment, an unprecedented agitation ensued, and the treaty was violently denounced, but was ratified by Washington, with the approval of the Senate, August 14, 1795. See JAY, JOHN.

Jeaffreson (jĕf'ĕr-sŭn), **John Cordy**, 1831–1901; English archivist; b. Framlingham; took up the study of ancient handwriting and archives, and, 1874, became one of the inspectors in ancient writings under the Royal Commission on Historical Manuscripts; works include "A Book about Doctors," "A Book about Lawyers," "A Book about the Clergy," "A Book about the Table," "The Real Lord Byron," "The Real Shelley," "Lady Hamilton and Lord Nelson," "The Queen of Naples and Lord Nelson," and "Victoria, Queen and Empress."

Jeanne d'Arc (zhŭn därk). See JOAN OF ARC.

Jeannette' Expedi'tion, a polar research party led by Lieut. De Long, U. S. N., which sailed from San Francisco, July 8, 1879, and entered the Arctic Ocean through Bering Strait. On June 13, 1881, the *Jeannette* was crushed by the ice, and sank in latitude 77° 15′ N., longitude 155° 50′ E. De Long tried to move S. to the New Siberian Islands, but his party became separated in a storm, and he and many others died of starvation on the banks of the delta of the Lena, in Siberia. One band under Commander Melville reached home in safety. Though disastrous the Jeannette expedition demonstrated that there was no continent at the North Pole.

Je'arim, Mt., one of the boundaries of the inheritance of Judah; was a wooded mountain, on which the city of Balah, or Kirjeth-jearim, was built.

Jebail, or Jebeil (jĕ-bīl), one of the most ancient cities of Phœnicia, the *Gebal* of the Bible and the *Byblus* of the classics; between Berytus and Tripolis; noted in mythology for the birth of Adonis, and in biblical history for having furnished the artificers (Giblites) of Solomon's temple. It was taken by the crusaders, and after varying fortunes finally came into the hands of the Turks. Jebail is now a village on the seacoast, 20 m. N. of Beyrout; contains a castle noted in the annals of the crusades.

Jebb, John, 1775–1833; Irish ecclesiastic and author; b. Drogheda; entered the Church of England, and became Bishop of Limerick, 1823. Residing in a district chiefly inhabited by Catholics, Bishop Jebb was noted for his liberal spirit toward them and his maintenance of their rights. He wrote several works on doctrinal theology, but is remembered chiefly by his "Sacred Literature," in which he combated some of the views of Dr. Lowth about Hebrew poetry, and elucidated many obscure or difficult biblical topics.

Jebb, Sir Richard Claverhouse, 1841–1905; Scottish Hellenist; b. Dundee; became classical examiner in the Univ. of London, Prof. of Greek at St. Andrews, Regius Prof. of Greek at Cambridge, representative of Cambridge Univ. in the House of Commons, and president of the Society for the Promotion of Hellenic Studies; knighted 1900; works include "The Attic Orators," "Modern Greece," "Homer," "Lectures on Greek Poetry," "The Growth and Influence of Classical Greek Poetry," "A Primer of Greek Literature," and an edition of the plays and fragments of Sophocles.

Jeb'el-er-Rahm. See ARAFAT, MOUNT.

Je'bus, son of Canaan and father of the people of Palestine called Jebusites. Their dwelling was in Jerusalem and round about in the mountains. The people were very warlike, and held Jerusalem till David's time.

Jeddo (yĕd'dō), old spelling of Yedo, now called Tokyo.

Jedu'thun, one of the four great masters of music belonging to the temple; is the same

as Ethan; Psalms xxxix, lxii, lxxvii, and lxxxix are said to have been composed by him; others bearing his name were probably composed or sung by his descendants or pupils.

Jef'ferson, Joseph, 1829–1905; American actor; b. Philadelphia, Pa.; descended from several generations of actors; appeared on the stage in boyhood in comic parts; joined a theatrical company in Texas, 1846, at the beginning of the Mexican War. Two days after Matamoras was taken by U. S. troops he played in the old Spanish theater of that place. In 1857, at Laura Keene's theater, New York, he appeared with great success as *Dr. Pangloss* in "The Heir at Law." In the same year he established his reputation as a great comedian by his performance of *Asa Trenchard* in "Our American Cousin." Dion Boucicault rearranged and rewrote the play of "Rip Van Winkle," in which Jefferson made the success of his life, playing nothing else for many years. In the latter part of his life he acted but a small part of each season, spending most of his time on his estate at New Iberia, La., fishing, painting, and entertaining congenial friends.

Jefferson, Thomas, 1743–1826; third President of the U. S.; b. Shadwell, Va.; admitted to the bar, 1767; member of House of Burgesses, 1769–74; active in pre-Revolutionary movements; delegate to the Continental Congress, 1775–78; chairman of committee to prepare the Declaration of Independence and author of the original draft of that document; resigned to assist in framing the Constitution of Virginia; governor of the state, 1779–81; again delegate to Congress, 1782–83; minister to Europe to negotiate treaties and then to France alone, 1784–89; U. S. Secretary of State, 1789–93; Vice President of the U. S., 1797–1801; elected President by the House of Representatives, 1801; reëlected, 1805; after retirement applied himself chiefly to founding the Univ. of Virginia. During his first administration as President he waged a successful war against the piratical Algerines, in which the navy of the U. S. won great distinction; Louisiana was purchased of Napoleon for $15,000,000; the public debt was greatly reduced; the W. country was explored by Lewis and Clarke and by Pike; the system of precedence was abolished, and a rational etiquette substituted. In his second term he had to deal with matters of a more serious nature, and in so doing increased the number of his political enemies. Burr's trial for the attempted raid into Mexico caused hostile criticism, and the President's embargo policy retaliating on Great Britain and France by prohibiting all U. S. vessels from leaving home ports, struck a heavy blow at the shipping interests, and started anew the opposition of the Federalists. The embargo was repealed in February, 1809. He declined urgent solicitations to accept a nomination for a third term.

Jefferson Cit'y, capital of the State of Missouri and of Cole Co., on the Missouri River; 125 m. W. of St. Louis; has an elevated site near the geographical center of the state, and is in a region of great agricultural and mineral wealth, timber, coal, iron, and glass-sand abounding; notable buildings include the state capitol, executive mansion, state armory, state penitentiary, U. S. Govt. building, and Lincoln Institute, a normal and manual-training school for colored youth; has manufactures of flour, agricultural implements, wagons, shoes, brick, ale and beer, and foundry and machine-shop products, besides special articles made in the penitentiary under the contract system. Pop. (1906) 11,416.

Jef'frey, Francis (Lord), 1773–1850; Scottish critic; b. Edinburgh; was admitted to the bar at Edinburgh, 1794, but devoted himself equally to literature; with Sydney Smith, Brougham, and Horner, founded the *Edinburgh Review*, 1802; became its official editor with the fourth number, and continued to edit it for twenty-six years, and wrote for it till near the time of his death. The whole number of his contributions is 200, of which 79 were selected for republication. In the larger part of them he appears as a literary critic, but several are devoted to metaphysics and to politics. His reputation at the bar increased with his success as a reviewer. He rose to the highest eminence as a pleader; was elected, 1821, Lord Rector of the Univ. of Glasgow, and, 1829, dean of the Faculty of Advocates; was appointed Lord Advocate, 1830; entered the House of Commons, 1831, and was elevated to the Scottish bench, 1834.

Jeff'reys, George (Lord), 1648–89; British jurist; b. Acton, Wales; was called to the bar, 1668; became common sergeant of the city of London, 1671; solicitor to the Duke of York, 1677; was knighted, and elected Recorder of London, 1678; appointed Chief Justice of Chester and made king's sergeant, 1680, and created a baronet, 1681. When the Oxford Parliament was dissolved, 1681, and Charles II determined to destroy the Whigs, Jeffreys became the most efficient agent of government. He labored against the city of London, and helped to extinguish its liberties. He was of counsel for the Crown on the trial of Lord Russell, was made Chief Justice of England in order to effect the destruction of Algernon Sidney, and presided at the trials of Oates and Baxter.

On May 15, 1685, James II made him a peer, as Baron Jeffreys of Wem. In the summer of that year he was placed at the head of a special commission to try persons accused of having taken part in Monmouth's Rebellion. Of the prisoners brought before him, 320 were hanged, 841 ordered to be transported and sold into the slavery of the tropics, and others punished with scourgings, imprisonment, etc. His cruelty was the more offensive because he traded in pardons, and thus enabled rich offenders to escape. He was made Lord High Chancellor of England, September 28, 1685. The Court of High Commission having been revived, Jeffreys was appointed its president, and took part in its worst acts. When James fled from London, Jeffreys made arrangements to sail for Hamburg, but landed for the indulgence of drunkenness, and was seized. The mob wished to tear him in pieces, but the authori-

ties succeeded in placing him in the Tower, where he died.

Jef'fries, John, 1744–1819; American physician; b. Boston; served as surgeon major of the British forces in America; 1780, settled in London; made with François Blanchard, January 7, 1785, a voyage in a balloon across the British Channel, which was the first successful attempt at aërostation on an extended scale; 1789, returned to Boston, where he delivered what is believed to have been the first public lecture on anatomy ever given in New England; but such was the prejudice against dissection that on the evening of the second lecture a mob carried away the subject.

Jehanghir (jä-hän-gēr'), **Abul Muzaffer Noureddin Mohammed,** d. 1627; Mogul emperor of Hindustan; son of the famous Akbar; succeeded, 1605; was affable, generous, easy of access to his subjects, and a patron of literature and the arts; wrote memoirs of the early part of his reign; Nourjehan, his empress, celebrated for her beauty, wit, and kindliness, has been the theme of many Oriental romances and poems.

Jehoahaz (jē-hō'ä-häz), d. 798 B.C.; King of Israel, son of Jehu; succeeded, 815; had a stormy, wicked, humiliating, and disastrous reign of seventeen years. See II Kings xiii, 1 9.

Jehoahaz, or Shal'lum, King of Judah; son of Josiah, whom he succeeded, though he was not the eldest son; was probably thought more fit than any of his brethren to combat the King of Egypt; reigned in Jerusalem only three months, 609 B.C.

Jehoiachin (jē-hoi'ä-kĭn), **or Coni'ah,** King of Judah; son of Jehoiakim; reigned in conjunction with his father about ten years; succeeded, 597 B.C.; was carried captive into Babylonia with 10,000 of his subjects by Nebuchadnezzar after an individual reign of less than four months.

Jehoi'ada, high priest, who succeeded Azariah in that office, and with his wife, Jehosabeath, rescued Joash, son of Joram, King of Judah, from the murderous violence of Athaliah, concealed him in the temple, and after seven years set him on the throne of David. While Jehoiada lived, and Joash followed his advice, every kingly undertaking succeeded.

Jehoi'akim, or Eli'akim, King of Judah; brother and successor of Jehoiahas; was made king, 608 B.C., by Pharaoh Necho, King of Egypt, on his return from an expedition against Carchemish. Jeremiah, the prophet, admonished the king to walk in the path of virtue and piety and to observe the law strictly, and set forth the results of disobedience; but, like many of his predecessors, the king relapsed into idolatry and wickedness. Nebuchadnezzar, King of Babylon, besieged Jerusalem, rifled the temple of all sacred and precious articles, left Jehoiakim as his vassal on the throne, and carried off the principal men of the city as hostages. After a reign of eleven years, Jehoiakim was slain and thrown into the common sewer.

Jehol (yä'hōl), **or Cheng-te',** city of Mongolia, 40 m. NE. of Pekin; contains the summer palace of the Emperor of China; is a flourishing town with abt. 10,000 inhabitants, and is connected with Pekin by an excellent road. The palace was built, 1703, and consists of a substantial brick wall 6 m. in circumference and inclosing extensive gardens and parks, pavilions and temples, in the common Chinese fashion. In the neighborhood of Jehol are several large Lama monasteries and temples; among them the celebrated Putalasu, built after the model of the palace of the Grand Lama of Tibet at Putala. The main building of this temple has eleven rows of windows; the stories are colored alternately red, green, and yellow.

Jehosh'aphat, fourth King of Judah; son of Asa; reigned, according to Usaher, 914 to 889 B.C. Although he was utterly defeated by the Syrians in the battle of Ramoth-gilead, and his first expedition to Ophir was foiled by the wreck of his whole fleet, his reign was generally very fortunate. He made strenuous efforts to extirpate idolatry, kept the nations on the borders in awe, and agriculture and commerce prospered under his rule.

Jehoshaphat, Val'ley of, deep and narrow glen, running N. and S. between the Mt. of Olives and Mt. Moriah, the brook Cedron flowing through its center, which is dry the greater part of the year. The Prophet Joel says: "The Lord will gather all nations in the valley of Jehoshaphat, and will plead with them there," from which passage many people have believed that the last judgment will be solemnized in this place.

Jeho'vah, or Yahveh (yä-vā'), Heb. JHOH, Hebrew name of the Supreme Being. The pronunciation and derivation of this name are matters of controversy. The Jews of later periods abstained from pronouncing it, and, wherever it occurred in reading, substituted the word Adonai (the Lord), or Elohim (God). The practice antedates the Greek version of the Septuagint, which everywhere substitutes Kurios. Its meaning throughout the Scriptures is "the Being" or "the Everlasting." See GOD.

Je'hu, King of Israel and founder of the fourth dynasty in the N. kingdom; son of Jehoshaphat and grandson of Nimshi; in youth was one of the guards of Ahab, and in the reigns of Ahaziah and Jehoram one of the chief military leaders. In the account of the vision which appeared to Elijah at Horeb in the time of Ahab that prophet was commanded to anoint Jehu king of Israel as instrument of the divine vengeance on idolatrous Israel (I Kings xix, 16, 17). This command was not obeyed until nearly twenty years later, when Jehu was anointed by one of the prophets under Elisha's directions, and proceeded to massacre King Joram, his mother Jezebel, his guest Ahaziah, King of Judah, seventy sons of Ahab, forty-two brothers of Ahaziah, and, in general, all the prophets, priests, and wor-

shipers of Baal. According to biblical record, the reign of Jehu (twenty-eight years) was marked by the decline of the power of Israel. According to the Assyrian records (including the black obelisk now in the British Museum), Jehu was a tributary of Assyria.

Jeisk (yā'ĭsk). See YEISK.

Jejeebhoy (jē-jēb-hoi'), **Sir Jamsetjee,** 1783–1859; Parsee philanthropist; b. Bombay, India; began life in poverty, made several voyages, became a merchant of Bombay, and died worth $5,000,000. His donations to charitable, educational, and other public objects were estimated at about $1,500,000. In 1842 he was knighted by the Queen of England, and, 1857, was made a baronet. His title descended to his eldest son, Cursetjee (b. 1811), who became a magistrate of Bombay, and assumed his father's name, Jamsetjee.

Jelalabad (jĕl-ä-lä-băd'), fortified town of Afghanistan; near the Kabul, on a fertile plain 1,824 ft. above the sea; 90 m. E. of Kabul. Its trade is entirely in the hands of the Hindus; its population varies from 3,000 to 10,000, according to the season. A single British brigade under Sir Robert Sale defeated here a large Afghan force, 1842.

Jelal-ed-Deen (jä-lăl'ĕd-dēn), "glory of the faith," Afghan usurper, known as Fyrouz Shah II, who reigned at Delhi, 1289–96, and was chiefly remarkable for his cruelties.

Jelal-ed Din Rumi (dēn rô-mē'), See RUMI.

Jellachich de Buzim (yĕl'ä-chĭch dė bôt'sēm), **Joseph** (Count), 1801–59; Austrian general; b. Peterwaradin; son of Baron Franz Jellachich, field marshal in the Napoleonic wars; entered the army at an early age; spent many years on the Turkish border in the military service, and when the Magyar revolution broke out, 1884, threw his great influence with the Slavic populations into the scale in favor of the Austrian Empire. At the request of a Slavic committee Jellachich was appointed to the chief command of the S. districts of the empire, under the mediæval title of Ban of Croatia, Slavonia, and Dalmatia. This title theoretically gave him an almost independent sovereignty, which he hastened to use by assembling a Slavic diet, being consecrated in the banate by the bishop, and organizing the S. Slavonians against the Hungarians. He invaded Hungary, effected a junction with Windischgrätz, aided in the reconquest of Vienna, and participated in the important campaigns of the ensuing year.

Jel'ly-fish. See ACALEPHÆ; MEDUSA.

Jemappes (zhā-măp'), town in province of Hainaut, Belgium; 3 m. SW. of Mons. Here the raw levies of the first French republic, under Dumouriez, won a decisive victory over the Austrian army, November 6, 1792. It has extensive manufactures, and in the vicinity are large coal mines. Pop. (1900) 10,435.

Jem'ba. See EMBA.

Jena (yā'nä), town in the Grand Duchy of Saxe-Weimar-Eisenach, Germany; on the Saale; 14 m. SE. of Weimar. Its university, founded 1558, was, 1787–1806, the most celebrated scientific institution of Germany. Schiller, Schlegel, Oken, Schelling, and Fichte were professors here, and more than one thousand students heard their lectures. The university is still an important scientific center, and as the center of the Herbartian movement in education has attracted to it many students from the U. S. On October 14, 1806, Napoleon totally defeated the Prussian army on the heights outside of Jena, and this battle, together with the defeat of Auerstadt on the same day, caused the prostration for many years of N. Germany. Jena is now a typical quiet university town. Pop. (1905) 26,360.

Jenckes (jĕnks), **Thomas Allen,** 1818–75; American legislator; b. Cumberland, R. I.; became a member of the Rhode Island bar; was clerk of the State Legislature, 1840–45, and member of Congress, 1863–71; was the author and advocate of the bill which established a uniform system of bankruptcy throughout the U. S.

Jenghis Khan (jĕn'gĭs kän). See GENGHIS KHAN.

Jenk'in, Henry Charles Fleeming, 1833–85; English civil engineer; b. near Dungeness; became an apprentice in one of the great machine shops of Manchester; subsequently served as a draughtsman in London, and drifted finally into the work of submarine cable laying, a field to which he was destined to devote many years of his life (1855–73). Much of his time during this period was spent on cable ships, at first in the Mediterranean, later in the transatlantic service, and finally on the coast of S. America. In 1868 he was appointed Prof. of Engineering in the Univ. of Edinburgh.

Jenks, Joseph, d. 1683; American inventor; b. Hammersmith, England; emigrated to Lynn, Mass., about 1645; was the first founder who worked in brass and iron in N. America, and probably the first inventor; received from the Massachusetts General Court, May 6, 1646, a patent "for the making of engines for mills to go by water," and for making scythes and other edged tools, with a new invented sawmill. Jenks is said to have made the dies for the silver coinage of the colony, 1652; contracted, 1654, with the selectmen of Boston "for an engine to carry water in case of fire," and, 1667, asked the general court for aid in wire drawing.

Jen'ner, Edward, 1749–1823; English physician; b. Berkeley, Gloucestershire; acquired the friendship of Sir Joseph Banks, who procured him the appointment of naturalist on Cook's second expedition, but retired to his native town, 1773, and became a surgeon apothecary. In 1796 he made his first successful arm-to-arm inoculation with the virus of cowpox as a preventive to infection with smallpox. The first idea of this measure had been conceived by him some twenty years before, when he

learned that the Gloucestershire peasants considered accidental cowpox (acquired in milking cows) a preventive of smallpox. In 1798 he announced his discovery, now established by abundant observations, but was almost universally denounced by physicians and clergy, often in the severest language. The importance of his discovery was finally conceded, and he received in all some £37,000 in grants from Parliament and other sources as testimonials to the value of his labors.

Jenner, Sir William, 1815-98; English physician; b. Chatham; became, 1848, Prof. of Pathological Anatomy and, 1857, of Clinical Medicine in University College, London; was appointed physician to the queen, 1861, and attended Prince Albert in his last illness; was the first to establish the difference in kind between typhus and typhoid fevers.

Jen'net. See HINNY.

Jephthah (jĕf'thä), ninth judge of Israel; natural son of Gilead; was chosen by the Gileadites to be their commander in a defensive war against the Ammonites. He chose to attack the enemy in their own country, first making an oath that if victorious he would sacrifice to the Lord whatsoever should first come forth from his house to meet him on his return. He conquered the Ammonites, and when he returned his daughter, an only child, issued from his house to greet him with timbrels and with dances. It is said that at her own request "he did with her according to his vow"; but some commentators suppose that he only consecrated her to perpetual virginity. Jephthah ruled Israel six years.

Jequitinhonha (zhä-kē-tēn-yōn'yä), river of Brazil; rises in the state of Minas Geraes, enters the state of Bahia, and falls, after a course of about 750 m., first N., then NE., into the Atlantic near the town of Belmonte. Its upper course runs through a mountainous region, and its rocky bed is here embarrassed by rapids and cataracts, of which that called Salto Grande, on the boundary of Minas Geraes and Bahia, is one of the most magnificent falls of Brazil. Its lower course is broad and smooth, but rather shallow, and its mouth is obstructed by sand bars. Nevertheless, the whole lower course from the mouth to Salto Grande is navigable for small steamers, as one of its arms, the Poassu, communicates by a navigable channel with the river Pardo, the Jequitinhonha is of great importance for the exportation of the rich products of Minas Geraes.

Jeřábek (yer'shä-bek), **František V.,** 1836-93; Bohemian dramatist; b. Sobotka; studied theology and philology; was employed on the editorial staff of the *Pokrok*, and later of the *Narodní Listy*; was active as a journalist and politician, but became a teacher at the high school for women at Prague. Though a lyric poet of merit, he is best known as a dramatist, and is considered one of the greatest dramatic writers of Bohemia.

Jer'ba, anc. *Meninx*, island of Tunis, in the Gulf of Gabes, where, May 11, 1560, about 18,000 Christians were killed by the Turks.

Jerbo'a, or Gerbo'a, common name for many small rodents of the family *Dipodidæ*, subfamily *Dipodinæ*, noted for their powers of leaping. They have the hind legs very much longer than the fore, only three toes on the hind foot, and the metatarsals united. The

EGYPTIAN JERBOA.

ears are large and rounded, the tufted tail much longer than the body, being 10 in. long, while the body is only 6 or 8. The jerboas inhabit desert or arid regions of Africa and Asia, are gregarious, nocturnal, and dwell in burrows. They are to the Old World what the kangaroo rats are to the New.

Jeremi'ah, second of the greater prophets of the Hebrew canon; began his work in the thirteenth year of King Josiah—*i.e.*, abt. 626 B.C. He survived the fall of Jerusalem (586), so that his work lasted for over forty years. He was born at Anathoth, in Benjamin. His father was a priest. During Josiah's reign occurred the invasion of the Scyths. This prophet's life, therefore, covered the catastrophe of the history of Judah. He had to contend against bigotry, obstinacy, and dogmatism and to endure persecution. He was imprisoned for speaking words of warning and opposition to the prevailing policy, and fled to Egypt. Whether he afterwards went to Babylon, or when or where he died, is unknown, though Jerome and Tertullian say that he died in Egypt, and his grave is shown in Cairo. Tradition attributes to Jeremiah the books of Kings and of Lamentations.

Jérémie, or Trou-Jérémie (trō-zhā-rā-mē'), village of attractive aspect in Haiti; 120 m. W. of Port au Prince; on the coast, near the SW. angle of the island. Near here was born a negro slave, Alexandre Davy Dumas, the father of the great novelist Alexandre Dumas.

Jeremie (jĕr'ē-mi), **James Amiraux, 1800-72;** English ecclesiastic and author; took holy orders, 1830; was soon appointed Prof. of Classical Literature in the East India College at Haileybury, holding that post twenty years. In 1833 he was chosen Christian advocate for the Univ.

of Cambridge; 1849, Regius Prof. of Divinity, and, 1864, Dean of Lincoln; was considered one of the most learned divines of his time; published a "History of Rome from Constantine to the Death of Julian" and a "History of the Church in the Second and Third Centuries," "Christianity in the Middle Ages," and many other occasional productions.

Jerez (or **Xeres**) **de la Frontera** (chā-rēth' dā lä frōn-tā'rä), town in province of Cadiz, Spain; on the Guadalete; 14 m. NE. of Cadiz. The plain in which it stands is hilly, extremely fertile, densely peopled, and very carefully cultivated; it produces the celebrated Xeres wine (sherry). The town itself is old and surrounded with walls, but its streets are wide and lined with handsome houses; its public buildings are elegant, and it contains many educational and benevolent institutions. Jerez is the classical *Asido* and the Arab *Sherish*. The name often occurs in the Arab chronicles. The town was recovered from the Moors by Alfonso the Wise, 1255. Pop. (1900) 63,473.

Jerfalcon (jĕr'fâk'n). See FALCON.

Jerichau (yär'ī-chow), **Jens Adolf**, 1816–83; Danish sculptor; b. Assens, island of Fünen; chief works are "Hercules and Hebe," "The Panther Hunter," "Christ, Adam and Eve after their Fall," "A Female Slave in Chains,". "David," and the "Oersted Monument" in Copenhagen. His wife, ANNE MARIE ELISABETH (b. Baumann, 1819–81), was a celebrated painter. Their son, HARALD ADOLF NICOLAJ JERICHAU (1852–78), was a landscape painter of rank.

Jericho (jĕr'ē-kō), flourishing commercial city of ancient Palestine, in the valley of the Jordan, on the W. side of that river, near its entrance into the Dead Sea. It was conquered and destroyed by Joshua, but was rebuilt on a neighboring site, was fortified by King Ahab, and was the seat of a school of prophets. It was embellished by Herod the Great, and was completely destroyed during the crusades. The site of ancient Jericho is at Tellor Sultan; of the second city of the name, the entrance to Wady Kelt; modern Jericho, called Erīha, is 1½ m. E. of the second, and on the N. bank of Wady Kelt. The road from Jericho to Jerusalem is still infested by robbers, as in the days of the Good Samaritan. The plain of Jericho is naturally very fertile.

Jeroboam (jĕr-ō-bō'ăm), name of two kings of Israel: (1) The founder of the Kingdom of Israel, son of Nebat, of the tribe of Ephraim, died abt. 953 B.C. On the death of Solomon he was elected by ten of the tribes to reign over them, with the title of King of Israel, Judah and Benjamin alone remaining to Rehoboam, 975 B.C. He resided at Shechem, which he fortified, and built temples at Dan and Bethel, where golden calves were made the symbols of the Divinity. His leading aim was to raise a barrier against any reunion of the tribes. (2) The thirteenth king of Israel, son of Joash, reigned 823–782 B.C. He was successful in his wars, but his reign was licentious and oppressive.

Jerome', Saint (SOPHRONIUS EUSEBIUS HIERONYMUS), abt. 340–420; one of the four great doctors of the Latin Church; b. Pannonia; was educated at Rome; baptized and took the name of Hieronymus, 365, and devoted himself in a monastery at Aquileia to the study of Scripture and theology. He afterwards went to Syria; lived four years in a hermit's cell in the desert near Antioch, and, 376, consented to receive priestly orders on the condition that he should not be required to take any pastoral charge. He immediately applied himself to acquire an accurate knowledge of biblical topography and a thorough familiarity with the Hebrew and Chaldee, visiting the most celebrated scenes of Bible history. To perfect himself in Greek he went to Constantinople abt. 380, and became the disciple of St. Gregory Nazianzen. Being called to Rome by Damasus, 382, he remained as secretary to that pope until his death, 384. Here at the pope's request he began his revision of the old Latin or Italic version of the Bible.

He also produced the translation of the Psalms called "Psalterium Romanum," and other valuable works. After the election of Siricius, Jerome set out once more for the East, and finally fixed his abode at Bethlehem, where his followers built several monasteries, of one of which, and of a hostelry and hospital for pilgrims, he had the direction. There he completed his Latin version of the Scriptures, which became in the W. churches what the Septuagint was in the E., and served as a basis for nearly all the earlier translations into the vernacular tongues of Europe. In 416 the Pelagians burned his establishment and compelled him to fly for his life, but he afterwards returned. His Latin version of the Bible is his most useful work, and most widely known, though in a corrupted form, under the name of the Latin Vulgate. Day, September 30th.

Jerome of Prague (präg), abt. 1375–1416; Bohemian religious reformer; studied in several universities, and organized the Univ. of Cracow. Abt. 1402 he began to disseminate secretly the doctrines of Wycliffe in Bohemia, and, 1408, openly identified his views with those of Huss. While Huss was imprisoned at Constance, 1414, Jerome went thither to defend him, but fled on learning that the attempt would be useless. He was arrested by order of the Count Palatine of Neuburg-Sulzbach, and delivered over to the council, May 23, 1415. His learning and power of debate enabled him to answer all arguments urged against him. On his final examination, May 26, 1416, he retracted a former partial recantation, and was at once condemned. On May 30th he was sentenced and burned at the stake at Constance, and his ashes were strewn on the Rhine.

Jer'rold, Douglas William, 1803–57; English humorist; b. London; was a midshipman in the navy, 1813–15, and was apprenticed, 1816, to a printer. His first play, "More Frightened than Hurt," after some years of neglect was very successful. The comedy "Black-eyed Susan" established his reputation. "Rent Day," "Men of Character," "Bubbles of the Day," "Time Works Wonders," "The Caudle Lectures" (first published in *Punch*, with

which he became connected, 1841), and numerous other plays, sketches, and tales, widely extended his fame as a humorist and a powerful delineator of character.

Jerrold, William Blanchard, 1826–84; English author; b. London; son of the preceding; was educated as an artist, and illustrated some of his father's articles, but later gave his attention to literature; was long prominently connected with the London press. Among his works are several comedies and farces: "Cool as a Cucumber," "Cupid in Waiting," etc.; novels: "The Disgrace of the Family," "Up and Down in the World," etc.; sketches: "Swedish Sketches," "Imperial Paris," "Life of Douglas Jerrold," "At Home in Paris," "The Cockaynes," and a multitude of articles in various London papers; also "London," illustrated by Doré, and "Life of Napoleon III."

Jer'sey, largest of the Channel islands; in the English Channel; 16 m. W. of the coast of France, and 100 m. S. of the coast of England; area, 28,717 acres, of which nearly 20,000 acres are under cultivation; pop. (1901) 55,000. The natives speak a kind of Norman-French, as the island originally belonged to the French province of Normandy. The ground is high and rocky, but presents many fertile valleys, which, on account of the fine, mild, and equable climate, are well adapted for the cultivation of fruits. Large quantities of peaches, apricots, apples, pears, grapes, and melons are annually exported to London. The oyster fisheries form another extensive branch of industry. Shipbuilding is also important. The principal occupation, however, of the inhabitants of the island is dairy farming. The principal towns are St. Helier's and St. Aubin.

Jersey Cit'y, capital of Hudson Co., N. J.; on the Hudson River, the Morris Canal, and the Pennsylvania, Central of New Jersey, Erie, Lehigh Valley, West Shore, and other railroads, opposite New York City, with which it is connected by several steam ferries and subway tunnels. The city is noted for its large foreign commerce, its extensive manufactures, and its stockyard and slaughter-house interests. As the city is included in the customs district of New York, no separate official account of its imports and exports is kept. Its manufacturing establishments include tobacco factories and sugar refineries that are among the largest in the world; glass, crucible, iron, steel, zinc, tin, copper, and boiler works; graphite pencil, oakum, soap, and candle factories; and potteries, foundries, and machine shops. There are two very large grain elevators, owned by the Pennsylvania and the Erie railways. There is an extensive abattoir in the N. part of the city, near the river front, and another in the NW. part, on the Hackensack River, both connected with the railways. It is on these abattoirs that New York City mainly depends for its daily supply of meat. The U. S. census of 1905 reported 628 factory system manufacturing plants, operated on a capital of $82,394,841, and having annual products valued at $75,740,934. The city contains a public library, St. Peter's College (Roman Catholic), St. Aloysius Academy, German-American School, Hasbrouck Institute, Christ's and St. Peter's hospitals, and many charitable and benevolent institutions. Jersey City was originally known as Paulus Hook; was laid out, 1804; incorporated as a village, 1820; chartered under its present name, 1838; enlarged by the annexation of Hudson and Bergen, 1870, and Greenville, 1872; and rechartered, 1889. Pop. (1905) 232,699.

Jeru'salem, chief city of Palestine; capital of the ancient united kingdom of Israel and Judah; 29 m. E. of the Mediterranean and 33 m. SE. of its port, Jaffa (Joppa); pop. abt. 70,000, of whom about two thirds are Jews, the remainder being Christians and Mohammedans. The E., S., and W. limits are defined by the ravines of the Kedron and the Bene-Hinnom, and beyond these the Mount of Olives, the Hill of Evil Council, and the W. heights remain as David must have seen them. On the N. there are no such marked topographical features. From Scopus the descent to the city is gradual, and it was in this direction that the suburb Bezetha existed which Herod Agrippa inclosed with a wall. The modern city walls, built only three hundred years ago by Solyman the Magnificent, probably inclose the area of the ancient city of David's day, with the exception of the S. portion of Zion and Ophel, which are now without the walls.

The city is encircled by walls, and has seven gates, the principal of which are the Jaffa, Damascus, and Abdul-Hamid gates. The Christian quarter is in the NW., the Mohammedan in the NE., the Jewish in the SE., and the Armenian in the SW. The streets are narrow, winding, dirty, and badly paved; broadest street is about 15 ft. wide; some are only 5 or 6 ft. The houses are of heavy masonry, two or three stories high, with few or no windows in the lower stories. The roofs are terraced or rise in domes, and the apartments receive light from interior courts. In the SE. is Mt. Moriah, on which is the Haram-esh Sherif ("the distinguished sanctuary"), an area inclosing the mosque of Omar, built, probably, on the site of the temple of Solomon.

Zion is the high broad hill which lifts itself by an abrupt front 400 ft. above the S. valley, its plateau extending from this brow 2,400 ft. to the Jaffa gate road. This height embraced nearly one half of the ancient city. Zion was the seat of the citadel which David stormed, and its broad, elevated summit became the "city of David." Here were the royal palaces and tombs of David's line, connected by a bridge with the Solomonian palace and the temple on Moriah. Here also Herod built his palace. On its NE. corner was the Xystus, or gymnasium, connected with the temple by another bridge. The height of Zion above the Mediterranean is 2,537 ft. The Mount of Olives rises only 200 ft. higher. The Tyropœon (valley of the cheesemongers) ran between Zion and Moriah S. into the Hinnom valley and the Kedron valley at their junction, the junction of the three forming the rich soil of the "king's garden."

The commonly received site of the Holy Sepulcher and Calvary lies about 400 ft. N. of a

line running from the Jaffa gate to the Mosque of Omar, and about 300 ft. W. of the street leading N. to the Damascus gate. There are many reasons for believing that the hill over the grotto of Jeremiah, NE. of the Damascus gate, is the Golgotha of the New Testament. One of the most prominent objects in Jerusalem is the old tower in the midst of the citadel near the Jaffa gate, 56 ft. 6 in. on one face and 70 ft. 3 in. on the other. Whichever one of the Herodian towers this was, its style of building tempts us to believe that Herod only rebuilt an ancient tower, and that we may have here "the tower of David builded for an armory."

The pools (so called) in and by Jerusalem are Birket Mamilla, Birket Sultan, the Pool of Siloam, and the Fountain of the Virgin without the walls, and Birket Israil (or Es-Serain) and the Pool of Hezekiah within the walls. The Birket Mamilla is supposed to be the "upper pool" (Isaiah vii, 3; II Kings xviii, 17). It lies 2,000 ft. W. of the Jaffa gate. The Birket Sultan is a section of the great W. valley dammed up for more than 500 ft. The Pool of Siloam is in the mouth of the Tyropœon at its junction with the Hinnom and Kedron. It is connected by a long, rude, and crooked subterranean passage with the Fountain of the Virgin on the other side of Ophel. This subterraneous aqueduct is connected with extensive rock-hewn caverns. The Fountain of the Virgin is a pool on the E. side of the Ophel rock, to which is a descent of twenty-eight steps. The pool is lower than the bottom of the valley, and is excavated deeply within the rocky wall. The water has a periodic and sudden rise of a foot in height, the periods varying from two or three times a day to once in two or three days. This periodic troubling of the water seemed at first to mark the Fountain of the Virgin as the Pool of Bethesda, but that has been discovered by excavations in the inclosure belonging to the Convent of St. Anne, farther N. Here, under the crypt of an ancient church, is a pool arched over with five arches which must certainly be the "five porches" of John v. The Birket Israil, just inside of the St. Stephen's gate and N. of the Haram, is the damming up of the valley that runs E. of Bezetha in a SE. direction into the Kedron. The Pool of Hezekiah is N. of the Jaffa gate street and to the SW. of the Church of the Holy Sepulcher. It is supplied by an aqueduct from the Birket Mamilla. One of several ancient aqueducts still conducts the water from Solomon's Pools to the city.

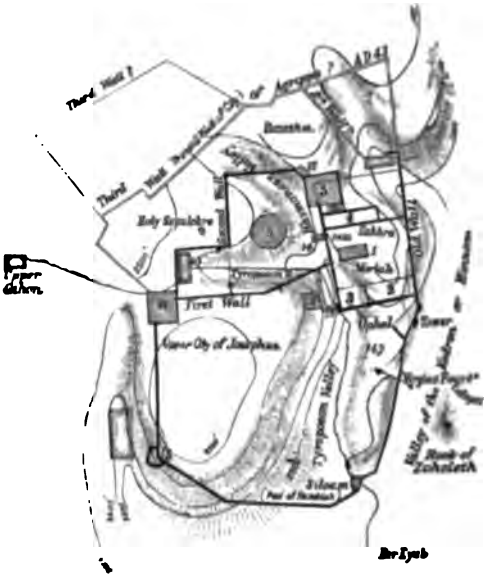
Among the many ecclesiastical edifices is the Church of the Holy Sepulcher, situated in the Christian quarter, and occupied by all the Christian communities in common, near which is the German Church of the Redeemer. The Latins possess for their own worship the Church of St. Saviour, which is attached to the Franciscan convent. On the ancient Bezetha is the French Church of St. Anne, a structure dating back to mediæval times. The Russians have a cathedral and, on the W. side of the Mount of Olives, a church. The Greeks, Armenians, Copts, Syrians, and Abyssinians, and the Franciscan monks have convents or hospitals, and the Jews more than seventy synagogues. The city has little commerce, and few manufactures, those of soap, chaplets, crucifixes, rosaries, and amulets being the most important.

The earliest biblical reference to Jerusalem is in Genesis xiv, 18, where Melchizedek brings forth bread and wine to Abraham on his return from the slaughter of certain invading kings, and receives from him a tithe of the spoils in token of fealty. Clay tablets found at Tel-el-Amarna on the Nile throw light on the relations between the Egyptian Govt. and subject cities in Palestine and Syria in the fifteenth century B.C., and show that Jerusalem was about to pass into the hands of "confederates," who in all probability had their headquarters at Hebron. The Jebusites later made Jerusalem their special stronghold and held the upper city on Zion for nearly four centuries. David, desiring a more central city than Hebron for his capital, organized an attack on the citadel and wrested it from the Jebusites. The concentrated royalty of the twelve tribes now made "the city of David" the seat of power and glory, and for four hundred and sixty years, till Nebuchadnezzar destroyed it, it stood forth as one of the conspicuous capitals of the world. The Ark of God was now brought from Kirjath-jearim and placed in a new tabernacle. This position of the ark on the large citadel hill (Zion) continued for forty years, making the name Zion a favorite name for the city, especially when viewed as a holy city, a center of worship. Under Solomon the city grew in magnificence. With the enormous wealth acquired by commerce, and that inherited, he erected a temple on the rocky height opposite Zion, raising the structure whose wall stones still bear the marks of the Tyrian workmen.

Under Solomon's successor, Rehoboam, the kingdom was divided, Jeroboam became king of the N. realm, and Jerusalem was left the metropolis of the tribes of Judah and Benjamin only, and of the subject countries at the S. and E. In the tenth century B.C. Shishak, King of Egypt, overran the Judean territory, made it tributary, and plundered the temple and royal palace. Asa, Rehoboam's grandson, defeated the Egyptians at the battle of Mareshah, 941, and Jerusalem regained her independence. Under later kings Baal worship prevailed, and the temple fell into decay, though for a time, under Jehoiada, and later, Hezekiah, Jehovah was worshiped. The Israelitish monarch Joash defeated Amaziah, King of Judah, abt. 826, plundered the city, and razed part of its wall. During Hezekiah's reign Sennacherib, King of Assyria, devastated the kingdom, but spared Jerusalem, a new stripping of temple and palace being his tribute. Josiah, who ascended the throne abt. 640, restored the worship of Jehovah. Abt. 605 Nebuchadnezzar, King of Babylon, made Jehoiakim, King of Judah, his vassal, and a few years later, besieged the city, which was saved only by the delivery of the king, Jehoiachin, with his wives and court, and all the treasure that could be gleaned; at this time, also, numbers of the higher classes, as well as craftsmen, were deported to Babylon. A rebellion led to the utter destruction

of the city, 588, and another deportation to Babylon.

Having been rebuilt after the captivity, though less than 50,000 of the exiles returned, Jerusalem was taken and pillaged by Ptolemy Lagi, 320, and thousands of the captives were carried into Egypt. In 168 Antiochus IV of Syria leveled the walls, defiled the temple, and forbade the Jewish ritual, but the Jews revolted and regained the city. A quarrel for the throne led Pompey, the Roman general, to assault the city, raze its walls, and put 12,000 people to the sword. Herod the Great,



JERUSALEM AT THE TIME OF KING HEROD. (Sketch showing approximately the lie of rock.)

1. Temple of Solomon. 2. Palace of Solomon. 3. Added on by Herod. 4. Exhedra (the tower Baris or Antonia). 5. Antonia (the Castle). 6. Cloisters joining Antonia to Temple. 7. Xystus. 8. Agrippa's palace. 9. Zion and Acra. 10. Lower Pool of Gihon, or Amygdalon. 11. Herod's palace. 12. Bethesda or Struthion. 13. Bridge built by Herod. 14. The Lower City, called sometimes Akre. 15. British cemetery, A.D. 1870.

who had obtained the title of King of the Jews, took Jerusalem by storm, 37, but sought the favor of the people by building a new temple. After the death of Herod Agrippa, the last Jewish monarch, 100 A.D., Judea was under procurators, some of whom were conspicuous for their utter disregard of Jewish customs and prejudices. Riots and insurrections ensued, and finally Rome made war in earnest. First, Vespasian, and afterwards his son Titus (both becoming emperors at length), conducted the war. The terrible dissensions among the Jews, the agony of the nation shut up within the walls of Jerusalem, the destruction of more than 1,000,000 Jews (including all the sick and old), the enslaving of all the youth, the entire demolition of the city, all this forms one of the gloomiest pages in history.

In Hadrian's reign, 118-138 A.D., there was an attempt to rebuild the city and establish the Jewish polity. Bar Cochba for three years kept the power of Rome at bay, until the insurrection was quenched in the blood of hundreds of thousands. Hadrian's exasperation at this event made him first raze everything, and then build a new city on the spot, which he peopled with Romans and called Ælia Capitolina. On the old temple site he erected a temple to Jupiter Capitolinus, and placed his own statue on the site of the Holy of Holies. Jews were not allowed to enter the new city, and this prohibition continued in effect till the empire became Christian, when permission was given them to weep by the W. temple wall (where, in spite of the frequent and wholesale destructions, much of the ancient wall of the sanctuary remains)—a custom continued to this day. Constantine restored the old name, Jerusalem. His mother, Helena, devoted herself to recovering the lost sites of Christian importance in Jerusalem and elsewhere in the Holy Land, and erected costly churches on these supposed sites. Julian, 363 A.D., attempted to rebuild the Jewish temple and restore the Jewish worship as a part of his design against Christianity, but the work was hindered and stopped by subterraneous fires, as Ammianus asserts.

In the first Christian centuries of the empire Jerusalem occupied the position of a venerable and sacred relic to which pilgrims constantly found their way. Bishops presided over the Church here, and emperors from time to time built or repaired the holy edifices. The first disturbance of this peaceful condition was when the Persian monarch, Chosroes II, took the city by storm, 614, destroyed the churches, and slew the ecclesiastics. Fourteen years afterwards the Greek emperor Heraclius restored the churches and reëstablished the Christian dominion in Jerusalem, but it was only for a short period. In 637 Omar made Jerusalem the first grand conquest of the rising Mohammedan power. From that day to this Jerusalem has been a Mohammedan city, except during the brief interval in which the crusaders held it. Ommiades, Abbassides, and Fatimites took their turns in ruling it from Damascus, Bagdad, and Cairo as their capitals; Christians were more or less persecuted from time to time, and the Church of the Holy Sepulcher was repeatedly destroyed and rebuilt. In 1099, after a Turkish tribe had had brief possession of the city, and had shown unusual severity to the Christians, but had been supplanted by the Egyptian caliph, the crusaders appeared before Jerusalem. In six weeks the city was in their hands, and Godfrey of Bouillon elected its king. It remained in the hands of the Christians till Salah-ed-din (Saladin), the Sultan of Egypt, reconquered it, 1187. Thrice afterwards the city was for a short time in Christian hands. In 1517 it fell into the hands of Selim, the Turkish conqueror of Egypt, and remains in possession of his successor, the Sultan, to this day. See JEWS.

Jerusalem Cher'ry, popular name of two shrubby species of *Solanum* cultivated as ornamental house plants (*S. capsicastrum* and *S.*

pseudo-capsicum), the first from Brazil and the latter from Madeira; grow only 2 or 3 ft.

JERUSALEM CHERRY.

high, and bear berries about the size of cherries.

Jer'vis, Sir John (Earl of St. Vincent), 1734–1823; English admiral; b. Meaford; became post captain, 1760, and rear admiral, 1787, and early during the French Revolution sailed to the W. Indies and captured Martinique and Guadeloupe; appointed Admiral of the Blue, 1795; and off Cape St. Vincent defeated a Spanish fleet, 1797, for which he was created earl; was first Lord of the Admiralty, 1801–04.

Jervis, John Bloomfield, 1795–1885; American civil engineer; b. Huntington, N. Y. The Croton dam, the Sing Sing bridge, High Bridge, and the Forty-second Street reservoir, on the site of the present Public Library, New York City, are monuments of his professional skill. He was also consulting and chief engineer of the Cochituate water works, Boston; of the Hudson River Railroad, of the Chicago and Rock Island Railroad, and of the Pittsburg, Fort Wayne and Chicago Railroad, retiring from active duty, 1866. He invented and had built in England, 1832, a locomotive called "Experiment," having the four-wheeled swiveling truck in front.

Jer'vois, Sir William Francis Drummond, 1821–97; English military engineer; b. Cowes, Isle of Wight; entered the Royal Engineers, 1839; served in several campaigns in Africa; became assistant inspector general of fortifications, 1856, and deputy director of fortifications, 1862; designed the fortifications of Anglesey, Quebec, Portsmouth, Plymouth, Pembroke, Portland, Cork, the Thames, and the Medway; at Bombay, the Hugli, Aden, and other places in India; improvements and additions to the fortifications of Bermuda, Halifax, Malta, and Gibraltar, and many of the defensive works in Australasia; promoted to lieutenant general, 1882.

Jesi (yā'sē), town, on the Esino, province of Ancona, Italy; is said to be of Pelasgian origin, and through the Umbrians and Gauls passed to the Romans, who called it Æsis; later fell into the hands of the Franks; was in the power of the Holy See (1447–55); was a vice prefecture under Napoleon, and, 1860, was incorporated with the kingdom of Italy. The city walls are flanked by towers. Among public buildings are an ancient cathedral, dedicated to St. Septimius, a townhall containing some fine pictures, and a seminary, lyceum, communal college, and technical school. The town has manufactures of paper, silk stockings, cloths, and soap, and carries on a large trade in wine, oil, grain, and cheese. It was the birthplace of Frederick II, under whose rule it was most prosperous. Pop. (1901) 23,208.

Jes'samine. See JASMINE.

Jes'se, John Heneage, 1815–74; English author; works include "Memoirs of the Court of England during the Reign of the Stuarts," "Memoirs of the Court of London from the Revolution in 1688 to the Death of George III," "George Selwyn and his Contemporaries," and "London, its Celebrated Characters and Places."

Jes'so (Japan). See YEZO.

Jessor', or Jessore', district and town of Bengal, British India; on the delta of the Ganges; area of district, 2,276 sq. m.; pop. 1,600,000; country flat and wet and the climate bad; town is the capital of the district; 70 m. NE. of Calcutta. Pop. of town, abt. 8,000.

Jes'ter, Court. See COURT JESTER.

Jes'uits, or Soci'ety of Je'sus, religious order of the Roman Catholic Church, known in the Church as one of the orders of "clerks regular." It was founded by St. Ignatius Loyola and approved by Paul III (1540). After St. Ignatius's death, his successors, especially Lainez and Aquaviva, improved the organization given to the order by its founder, but without essentially modifying it in any way. The order consists of four classes of members: Lay brothers, scholastics who for fifteen years before being ordained priests study literature, philosophy, the sciences, and theology, and teach the humanities in college; the spiritual coadjutors, who are priests with the three vows of chastity, poverty, and obedience; and the professed fathers, who take a fourth vow to go wherever they may be sent by the pope. These last alone have a voice in the government of the society. The purpose of the society, as stated by its founders and adherents, is threefold: (1) The personal sanctification of the members; (2) preaching and missions; (3) the education of youth. In point of doctrines there are two theories which are more or less closely identified with the society: One dogmatic, on grace and predestination, whereon the Jesuits had long and arduous controversy with the Dominicans; the other moral (probabilism), though the theologian who first formulated this theory was not a Jesuit, but a Dominican.

The golden age, the time of highest prosperity, of the Jesuits lasted about one century. Within that period it produced (1) a great number of saints—Ignatius, Xavier, Aloysius of Gonzaga, Stanislaus Kostka, Francis Borgia,

and many others; (2) many learned men of the highest order (*a*) in exegesis, such as Maldonatus, Bonfrère, Salmeron, and Lapide; (*b*) in dogmatic theology, such as Bellarmin, Suarez, Vasquez, Ruiz, Petavius, and others; (*c*) in moral theology, such as Sanchez, Lessius; (*d*) in history, the Bollandists; (3) numerous and zealous missionaries who preached the Gospel in Europe, America, India, China, and Japan. The Reformation was already solidly established in N. Europe before the Jesuits were founded, and for some time before they began to exercise a wide and powerful influence. Ignatius's idea of founding the order had come to him long before he heard of Luther or his work. In the Council of Trent, in spite of their recent foundation, the influence of the Jesuits was important. Fathers Lainez, Salmeron, and Le Jay assisted in the deliberations, the two former as theologians of the Holy See. Lainez was the only theologian of the council allowed to talk more than an hour on any subject. Many of his extemporaries were inserted word for word in the acts of the council. In the Catholic reaction that followed the Council of Trent the Jesuits played a preeminent part all over Europe, and especially in Germany. In the matter of Jansenism in France they fought persistently for the doctrine of the Church.

The American missions of the Jesuits embraced the entire New World. The mission of Brazil was opened by St. Ignatius himself, who sent de Nobreza thither, 1549, where he reformed the colonists and founded many Christian communities of Indians. Tolosa and Anchieta, Vieyra, and many others, followed in the same regions during the sixteenth and seventeenth centuries, while at the same time Chile, Peru, and Mexico received the faith from other members of the society. By the beginning of the seventeenth century the "reductions" of Paraguay were founded. In N. America the Jesuits were found at Quebec, 1625; the conversion of the Hurons soon followed, and their attempts to convert the Iroquois, in which Lallemand, Daniel, and Brébeuf suffered martyrdom. Rasles in Maine and Jogues in New York were the pioneers of Christianity among the Indians; Marquette discovered the Mississippi; and Bancroft wrote that "the history of their labors is connected with the origin of every celebrated town in the annals of French America; not a cape was turned, not a river entered, but a Jesuit led the way." In 1697 they landed in California, and for a long time labored among the Indians, winning them by their musical skill, and teaching them the arts of civilized life.

The suppression of the society took place, 1773, by the bull "Dominus ac Redemptor Noster" of Clement XIV, "on the ground of too numerous complaints and accusations of which the society was the object, without declaring on their guilt or innocence." In 1814 by the bull "Sollicitudo Omnium Ecclesiarum" the order was reestablished. In many Europ[illegible] and some S. American states they are yet forbidden to associate or teach publicly, while in others they enjoy absolute freedom. The vast majority of the society is occupied at present in missionary or teaching work, with a certain number devoted to purely scientific occupations.

Jessulmir'. See JAISALMIR.

Je'sus Christ, founder of the Christian religion; born in Bethlehem, a city of Judea, during the reign of the Emperor Augustus, probably in the fourth year (or perhaps the sixth) before the Christian era; crucified in or near Jerusalem, at a place called Golgotha, in the thirty-fourth or thirty-fifth year of his age. His mother was Mary, who was betrothed to a carpenter named Joseph, when "she was found with child of the Holy Ghost," and her husband "knew her not till she had brought forth her first-born son," who was named Jesus. Joseph and Mary resided in Nazareth, an obscure town in lower Galilee, whence they went up to Bethlehem to be taxed, in compliance with a decree of Augustus, and because Joseph was of the house and lineage of David. It was there that the child was born, and laid in a manger, the inn being full. Soon after his birth three wise men (magi; according to ecclesiastical tradition, three kings) came from the E., guided by a star, and worshiped him. Their inquiries in Jerusalem had excited the suspicion of King Herod, for fear of whom the parents of Jesus, warned in a dream, fled with him to Egypt. Herod, who feared the loss of his throne if the Messiah were acknowledged, gave orders that all the male children in and near Bethlehem, from two years old and under, should be put to death. After the death of Herod, a few months later, Jesus was brought by his parents to Nazareth.

Of his early life, till the commencement of his public ministry, when he was about thirty years of age, the canonical Gospels give only one incident, his interview with the doctors in the temple when he was twelve years old. It is probable, as the gospel narrative intimates, that he followed the occupation of a carpenter. His appearance as a public teacher was heralded by John the Baptist. Jesus, afterwards coming to the Jordan at Bethabara to John, was recognized by him as the Messiah, and was baptized by him at his own command. The public administration of baptism was followed immediately by the fast for forty days in the wilderness, and the temptation by the devil. Directly after this he selected the first five or six of his disciples, subsequently called apostles, and began to promulgate his doctrines and to perform miracles. His numerous miraculous cures, and the increasing number of believers in him as the Messiah, excited the enmity of the Pharisees, who sought to do violence to him. When the third Passover in his ministry occurred, he left Judea, and passed along the coasts of Tyre and Sidon, repeating his miracles. The transfiguration, the foreshadowing of his own sufferings, and the choice of seventy disciples, whom he sent two by two into all the places which he intended to visit, preceded his journey to Jerusalem to the Feast of Tabernacles.

He made his entry into Jerusalem riding on an ass, and was received in triumph by the people. At the fourth and last Feast of the

Passover with his disciples, he announced that on that night one of them would betray him, designating Judas Iscariot as the traitor, and instituted the Lord's Supper. Afterwards with great agony of spirit he prayed in the Garden of Gethsemane. Thither Judas came with an armed band, and betrayed him by kissing him. Refusing the offers of assistance, Jesus freely surrendered himself, when his disciples fled. He was brought before the Court of the Sanhedrim, adjudged guilty of blasphemy, and condemned to death. He was carried thence, on the charge of sedition, before Pontius Pilate, the Roman procurator of the province, who was forced to condemn him, although declaring his belief in his innocence. He was scourged, a scarlet robe and a crown of thorns were put on him, and he was crucified between two thieves. In the evening Joseph of Arimathea, a disciple of Christ, begged the body and buried it. This was on the afternoon of Friday. On the third day (Sunday, hence called the Lord's Day) he rose from the dead, appeared to his eleven remaining disciples and to many others, remained with them forty days, and then visibly ascended to heaven. See CHRISTOLOGY; CHRISTIANITY; INCARNATION; MESSIAH.

Jesus, Soci'ety of. See JESUITS.

Jet, variety of lignite, resembling cannel coal, but harder, of deeper black, and of more brilliant luster. From its susceptibility of taking a fine polish and its intense blackness, it has been largely used for mourning articles of ornament.

Jet'sam, in law, goods which do not float nor come to land when a ship is sunk or the articles are thrown overboard as a measure of safety. Under English law their ownership is unaffected, as this act of necessity cannot be construed into a renunciation of his property by the owner. At common law such goods belonged to the crown if not duly claimed by the owner; but at present their net proceeds are paid into the imperial treasury. In the U. S. the net proceeds appear to belong to the Federal treasury, in case the property is not claimed by the owner. If the property is cast by the sea on the land, it is then called "wreck," and is subject to state law. See FLOTSAM.

Jet'ty, a pier or dike built out from the land into the water for the purpose of improving a harbor or river, or of deepening and maintaining a channel across a shoal by compelling the water flowing over the shoal to pass through a narrower channel. The principles involved in the jetty system may be thus briefly stated: First, the current is caused by the fall of the water from a higher to a lower level, which fall is indicated by the slope or inclination of the surface of the water. Second, the friction of the bed over which the water flows is the chief force opposed to the current. Third, the current will be increased by either increasing the slope of the surface or the volume of water passing through the channel, or by lessening the friction. Fourth, the friction of the bed controls the velocity of the current, just as the brakes of a train going down grade without the aid of the engine regulate the velocity of the train. Fifth, friction increases just as the width of the bed increases, *i.e.*, if the bed of the channel be twice as great, the friction will be twice as great. It does not increase with the weight or depth of the water, but with the square of its velocity. Sixth, the power of water to transport sand increases with the square of the velocity of the water; hence if the velocity be doubled it can transport four times as much sand.

The first effect of contracting the channel will be to increase the slope of the surface of the water through the contracted part at each change of the tide or flood of the river. A more rapid current will result, and as the channel deepens, the basin will be filled and emptied more quickly, and the slope through the channel will be lessened. But when it has resumed its former inclination, the velocity will still be greater than before, because by narrowing the channel the friction which formerly retarded the flow will have been lessened. Hence the deepening will continue until the enlargement permits the tide to enter and leave the basin more rapidly than ever, by which a still less slope reduces the velocity so much that the current no longer moves the particles composing the shoal, and thus a new condition of stable equilibrium is established. Among the permanent results which will follow will be—first, a deeper channel through the jetties; second, less frictional resistance to the flow of the water; third, less surface slope; fourth, greater volume of discharge through the channel; and, fifth, greater tidal oscillations in the basin.

The most notable jetties are at the mouths of the Mississippi, Danube, Oder, Pregel, Maas, Memel, and Vistula. Many river mouths on the Atlantic and Pacific coasts of the U. S., as well as on the Great Lakes, have been jettied. At Sulina the mouth of the Danube was deepened, from 9 ft. to 21 ft., by this means. Afterwards the mouth of the Mississippi was deepened by James B. Eads from 8 ft. to 30 ft. The channel of 21 ft. depth, obtained in 1869 at the mouth of the Danube, has been kept without any extension of the piers seaward and without resorting to dredging. Neither has there been any advance of the bar seaward in the direction of the issuing current, although there has been considerable sediment deposited in advance, but on the flanks of the jetties, the Danube being essentially a sedimentary river in times of flood. At the mouth of the Mississippi a channel of over 30 ft. in depth has been maintained since 1879. One of the most convincing arguments for improving the mouths of rivers by jetties appears in the facts given in the following table:

TABLE OF DEPTHS AT MOUTHS OF SEVEN GERMAN RIVERS IMPROVED BY JETTIES

NAMES OF RIVERS	Original depth	Depth, 1874	Depth, 1891
Persante	4 feet	15 feet	16.5 feet
Wipper	4 "	13 "	12.53 "
Warnow	6 "	13 "	17.16 "
Trave	7 "	18 "	18.81 "
Niemen	10 "	23.5 "	23.1 "
Oder	7 "	24 "	24.75 "
Pregel	12 "	20 "	23.1 "

See BREAKWATER; DOCKS AND DOCKYARDS.

Jet'tison, throwing overboard of goods for the preservation of a ship, its cargo, crew, or passengers. "Goods" includes not only the cargo, but the ship stores, its cables, anchors, boats, sails, mats, tackle, and portions of the ship itself necessarily sacrificed. Even the grounding of the ship has been dealt with as a jettison. See FLOTSAM; JETSAM.

Jev'ons, William Stanley, 1835-82; English philosopher and political economist; b. Liverpool; Prof. of Logic, Mental and Moral Philosophy, and Cobden Lecturer on Political Economy in Owens College, Manchester, and Prof. of Political Economy in University College, London; chief works, "Principles of Science," "Studies in Deductive Logic," "Theory of Political Economy," and "Money and the Mechanism of Exchange."

Jew'el, or Jew'ell, John, 1522-71; English bishop; b. Buden, Devonshire; was one of the eight divines appointed by Elizabeth to hold a controversy at Westminster with eight Roman Catholics; 1559, was placed on the commission to extinguish Catholicism in the W. dioceses of England, and, 1560, was made Bishop of Salisbury. His most famous work is "Apology for the Church of England," of which Elizabeth ordered a copy to be chained in every parish church.

Jew'elry, jewels collectively. In a restricted sense, jewels are precious stones, including pearls, set in gold or silver, and worn as personal ornaments, but the term is more generally applied to such ornaments made of the precious metals, or even of the baser metals. These may be either plain or embellished, as by being engraved, chased, enameled, or the like. The use of jewelry is probably a development of a still earlier custom of using seeds, berries, shells, animal teeth, and bright perforated pebbles, for adornment. In the Orient there has been but little change in form or variety of workmanship for more than 2,000 years, as is attested by the jewelry of India, which has preserved its ancient character to the present time. Many of the bracelets, earrings, and other objects of modern times are ornamented with minute gold beads, filigree wires, quaint chainwork, etc., in the very same way as those taken from Cypriote or Etruscan tombs. It is probable that the Etruscan people and those of ancient Greece obtained many of their motives at that early date from India. Active trade was carried on with the Orient by the Phoenicians 2200 B.C.

The jewelry found in Egypt, 1859, in the coffin of Queen Aah Hotep was of the highest character, the hammering, piercing, chasing, and the setting of colored stones being quite equal to the work of a much later period. The ornaments found by Schliemann at Mycenæ, and what he termed ancient Troy, showed a remarkable variety of ornamentation and a high standard of workmanship. The wonderful tombs on the island of Cyprus, as, for example, those preserved in the di Cesnola collection at the Metropolitan Museum of Art in New York City, and Etruscan objects, are for delicacy and beauty of workmanship equal to anything made in any period. The Merovingian jewelry of the fifth century, and that of the Anglo-Saxons of a later date, is noted for the beauty of the goldwork and the utilization of slabs of garnet set in plates of gold. Very beautiful ancient jewelry of gold and enamel has been found in Ireland.

During the last century jewelry has been manufactured in greater quantities than ever before, and certain cities have become noted for the production of special kinds of jewelry. The finest jewelry is made in London, Paris, and New York. The manufacture of imitation jewelry is a great industry in France. Nearly all of the medium-quality jewelry of England comes from Birmingham. In Germany, Hanau and Pforzheim produce immense quantities of jewelry of all grades, but principally the cheaper kinds. At both these places there are government schools for special instruction in jewelry making, as also at Turnau in Bohemia. Amsterdam is world renowned for its diamond cutters. Nearly all of the garnet jewelry of the world is manufactured in Prague and one or two other Bohemian cities; from Vienna come the so-called rococo styles, in which enamel, turquoise, and garnet are used; from Venice, filigree, and from Florence and Rome mosaic jewelry; and from Königsberg and Dantzic most of the amber jewelry of commerce manufactured. The products of the coral fisheries of the Mediterranean and on the African coast are sent to Naples and other Italian cities, where they are manufactured into jewelry for shipment. Enameled jewelry, generally of silver, consisting either of filigree, enamel, silver with transparent cloisonné or an inlaying of niello (an alloy of silver, sulphur, and antimony), is extensively made in Russia, Norway, and Denmark. Gold and silver filigree is manufactured in great quantities in Venice, Malta, Mexico, and in other Mexican cities. Rings embellished with zodiacal signs are peculiar to the W. Africa coast, where they are made by the inhabitants of Dahomey. Steel jewelry is made in immense quantities in both France and Germany, and has entirely replaced the so-called marcasite jewelry, which was made out of small faceted iron pyrites; ivory jewelry in France, Germany, and Great Britain; tortoise-shell jewelry chiefly in Florence, Rome, and Naples in Italy. See GEMS; PRECIOUS STONES.

Jewett, Milo Parker, 1808-82; American educator; b. St. Johnsbury, Vt.; was professor in Marietta College, Ohio, 1835-38; founded, 1839, the Judson Female Institute in Marion, Ala.; established a seminary for girls in Poughkeepsie, N. Y., 1855; suggested to Matthew Vassar the idea of an endowed institution for the higher education of women, and became first president of Vassar College, 1862; author of "Baptism," "Relations of Boards of Health and Intemperance," "The Model Academy," etc.

Jewett, Sarah Orne, 1849-1909; American story writer; b. S. Berwick, Me.; widely known for her tales of provincial life in New England; include "Deep Haven," "A Country Doctor," "A Marsh Island," "The Story of the Nor-

mans," "The King of Folly Island," "A Native of Winby," "The Country of the Pointed Firs," "The Tory Lover."

Jew'fish, name given to several large fishes of the family *Serranidæ*. One species, the *Promicrops guttatus*, found along the Florida coast, sometimes attains a weight of 700 lbs. Among other large jewfishes are *Epinephelus nigritus*, found in the Gulf of Mexico, and *Stereolepis gigas*, of the California coast.

Jew'ish E'ra, in chronology, a period of time of Hebrew origin and observance, which was substituted for the era of the Seleucidæ in the fifteenth century; dates from the creation, which the Jews consider to have been three thousand seven hundred and sixty years and three months before the beginning of the Christian era. This period of time added to a given year of the Christian era will show the corresponding year in the Jewish era; as 1907 (Christian) is 5667–68 (Jewish), the year 5668 beginning September 8th. The Jewish year consists of either twelve or thirteen months, of twenty-nine or thirty days. The civil year commences with the month Tisri, immediately after the new moon following the autumnal equinox; the ecclesiastical year begins with Nisan.

Jews, He'brews, or Is'raelites, a Semitic people, whose ancestors appeared at the dawn of history on the banks of the Euphrates, Jordan, and Nile. The opening event of Jewish history is the emigration (abt. 2000 B.C.) of the Semite Abraham from Ur to the Chaldees. Under Abraham, Isaac, and Jacob the people merely formed one nomadic family, in which the worship of one God, the rite of circumcision, and other traits of the future nation are found. It was in Lower Egypt, however, whither Israel had migrated, and where his descendants resided 430 or, according to some, 250 years, that they became a powerful nation. Joseph, having become Grand Vizier of Egypt, assigned his brothers a residence in the fertile Goshen. They increased rapidly and became formidable to the Egyptian monarchs, who required them to rebuild and inhabit cities. They found a leader and deliverer in Moses.

The number which left Egypt was 603,550 fighting men, exclusive of the Levites. The law, a code at once moral, religious, and political, was given to the Hebrews from Mt. Sinai; God himself was their leader, their king; the constitution is strictly theocratic; a violation of it sacrilege. The possession of Palestine was assured to them, and they set forward again for the promised land. On arriving at the frontiers of their country their spies brought them back word that it was occupied by fierce and warlike people, and they demanded to be led back to Egypt; but Moses determined to conduct them again into the desert, to form a new generation of bold and hardy warriors; there they passed thirty-eight years as a nomadic nation. After the death of their great lawgiver, the Hebrews entered the land which contained the bones of their fathers. Under Joshua, after a contest of seven years, they obtained possession of the country.

The period 1500–1100 is considered as the heroic age of the nation, which, after its gradual transition to stationary abodes and agriculture, lived in constant disputes with its neighbors, the Arab nomads, the Philistines, and the Edomites. The country was divided among twelve tribes, *viz.*, the ten tribes of the sons of Jacob—Reuben, Simeon, Judah, Dan, Napthali, Gad, Asher, Issachar, Zebulon, and Benjamin—and the two tribes of the sons of Joseph—Ephraim and Manasseh. The preservation of the confederacy and of the Mosaic law was especially provided by the distribution of the Levites (a caste of priests) in forty-eight cities and by making the high priesthood hereditary in the family of Aaron. The judges, who appear in times of emergency, were active and heroic military leaders, whose authority ceased with the cessation of the danger.

During eight years they were oppressed by the Mesopotamian king Cushan-Rishathaim, from whose yoke they were delievered by Othniel; eighteen years of Moabitish and twenty of Canaanitish servitude (from which they were delivered by Deborah) were followed by seven years of devastation by the Midianites, who were destroyed by Gideon. Jephtha, a captain of freebooters, expelled the Ammonites, and offered up his daughter as the price of the deliverance. The incursions of these Bedouin hordes were desolating but transient. The longer oppression of the Philistines, to which even the strength and courage of Samson could not put an end, seemed to threaten the destruction of the state; but Samuel, at once a prophet and a judge, restored the worship of Jehovah, reformed the manners of the people, and forced the Philistines to evacuate the country. His design of rendering the judicial dignity hereditary in his family was frustrated by the corrupt character of his sons, and the nation demanded a king. Samuel nominated Saul, a youth of tall person, but of no political importance to the throne, and a formal constitution was drawn up and deposited in the ark.

The king was little more than the military leader of the nation, bound to act according to the commands of Jehovah, without a court or permanent residence. The nation was still a mere agricultural and pastoral people, without wealth or luxury, but gradually acquiring a warlike character. Saul gained some victories, and was acknowledged king; but the victorious monarch was unwilling to submit to the dictation of the prophet, and ventured to consult Jehovah himself. The offended Samuel secretly anointed another king, the young shepherd, David, son of Jesse, who succeeded to the Hebrew throne on the death of Saul. He was at first acknowledged only by his own tribe, that of Judah. The eleven other tribes declared for Ishbosheth, son of Saul. On the death of the former, however, David became king of the whole nation.

His reign (1055–1015) is the era of an entire change in the constitution of the state and the condition of the nation. By his victories the state received large additions by way of conquest, and his kingdom extended from the Euphrates to the Mediterranean and from Phœ-

nicia to the Arabian Gulf. A new residence was fixed at Jerusalem. The strict observance of the worship of Jehovah as the exclusive national worship was maintained, commerce was established, and the general cultivation of the nation promoted. At the same time the foundation was laid for the future disunion and final decline of the state; for, although the nation during his reign and that of his son Solomon reached the highest point of its power and prosperity, the excessive splendor of the religious worship appealed too much to the senses, and the introduction of foreign manners and customs enervated the national character and the moral simplicity of the people. The reign of Solomon (1015–975) was the splendid reign of an unwarlike, ostentatious but cultivated monarch. The kingdom was organized anew for the maintenance of a luxurious court. Foreign commerce was carried on as a monopoly of the crown, and a costly temple and palace were erected in the royal residence. While the metropolis grew rich, the country was impoverished and oppressed. The gradual internal decline was hastened by the introduction of the worship of foreign gods, and Syria, which had been gained by conquest, was lost. Rehoboam was so little able to avert the threatening storm that he succeeded to the government of only two tribes, Judah and Benjamin; the ten other tribes formed the Kingdom of Israel under Jeroboam.

The capital of Israel was at first Sichem, afterwards Samaria; that of Judah was Jerusalem. Although Israel was larger and more populous, Judah was richer and in possession of the national temple and the priesthood. The jealousy and wars between the two kingdoms were rendered more dangerous by connections with foreign princes.

The Kingdom of Israel survived the separation 253 years, under nineteen kings, who succeeded each other by means of violent revolutions. Shalmaneser, King of Assyria, took Samaria, the capital, and put an end to the Kingdom of Israel, carrying away the inhabitants into the interior of Asia, 722 B.C. Judah existed, under twenty kings of the house of David, until 588. Jehoshaphat (914–891) restored the worship of Jehovah. Hezekiah, in whose reign Isaiah prophesied (728–699), delivered his country from the tribute to Tiglath-Pileser. During the reign of Manasseh (699–644) the worship of the Phœnician Baal was introduced and the laws of Moses fell into oblivion. Josiah (642–611) restored the temple and worship of Jehovah, recovered the lost book of the law, and introduced reforms according to it. In 606 Nebuchadnezzar rendered the country tributary to Babylon, and on a third invasion, in consequence of an attempt to throw off the Babylonian yoke, took Jerusalem (588) and carried away the inhabitants.

After the Babylonian captivity the Hebrews were called Jews, the greater part of the nation having remained in the middle and E. provinces of the Persian Empire, and only 42,360 men, with their families, principally of the tribes of the Kingdom of Judah, having returned to their country when permission was granted by Cyrus (536 B.C.). They founded a new kingdom in Judea, dependent on Persia. Jerusalem, the temple, and the Levitical cities were rebuilt; the writings of Moses and the historical and prophetical books collected; the great synagogue of the 120 learned men established for the critical revision and explanation of the Holy Scriptures, as well as separate synagogues and schools for the instruction of the people. All these institutions did not enable Ezra and Nehemiah, the restorers of their nation, to revive the primitive Mosaic constitution. The later Jews could retain only the letter of the law, and, in their expositions, lost themselves in the subtleties which they had learned from the Chaldeans. In enterprise and activity, however, they surpassed their fathers. Their commerce and their annual pilgrimages to the temple, to which each Jew was obliged to make an offering, accumulated at Jerusalem more treasures than Solomon's age had ever seen. Although on the fall of the Persian monarchy they submitted to Alexander the Great, and were involved in the wars of his generals for the supremacy, yet their fate was not hard. Ptolemy, King of Egypt, who took possession of Palestine 320 B.C., allowed them the enjoyment of their customs and granted the colonies which he transplanted to his capital (Alexandria), for the purpose of extending its commerce, peculiar privileges.

Seleucus IV attempted to plunder their temple, and Antiochus IV determined to destroy their religion. His pretext for this was the shameful spectacle displayed at the Syrian court in the rivalry of the priests and nobles; but the nation adhered with obstinacy to the forms of the Mosaic worship. When, therefore, Antiochus set up the Olympian Jupiter for worship in the temple and ordered the Jews to sacrifice and eat swine, many suffered the most terrible death rather than transgress the law of Moses. In vain were Jerusalem and the surrounding country laid desolate. These persecutions only served to develop a national spirit, which broke out in the insurrection of the Maccabees. Judas, surnamed Maccabeus ("the hammer"), defeated the Syrians, took Jerusalem, and restored the Mosaic worship (165 B.C.). A new epoch of glory begins under the government of the Maccabees. Three brothers of this family of heroes—Judas, Jonathan and Simon—bore successively the dignity of high priest, and completed their deliverance from the Syrian yoke. Simon left to his son, John Hyrcanus (135 B.C.) an independent kingdom, secured by an alliance with the Romans.

In his time arose the sects of Pharisees, Sadducees, and Essenes. His son, Judas Aristobulus, received the royal dignity (105 B.C.). After the death of Queen Salome (70 B.C.), who was ruled by the Pharisees, the succession was disputed by her sons Hyrcanus and Aristobulus. The war between the brothers introduced foreign umpires. Pompey conquered Judea (63 B.C.), according to the Roman policy, for the weak Hyrcanus. This result of the contest put an end to the new freedom of the Jews. Jerusalem lost its walls, the kingdom its new conquests, the nation its

independence, and the family of the Asmoneans its royal dignity. Hyrcanus was made high priest and ethnarch, and each Jew became a tributary to the Romans. It was in vain that the sons of Aristobulus endeavored, by repeated insurrections, to restore the former state of things. The Roman power kept the people in chains, and a false friend (Antipater of Idumæa) introduced himself, as a Roman procurator, into the family of Hyrcanus to effect its ruin. While the Asmoneans were struggling for independence, Herod, Antipater's son, was securing the kingdom for himself at Rome. Antigonus, son of Aristobulus II, who had maintained himself five years in Jerusalem by the assistance of the Parthians, was expelled by the new king, Herod, 35 B.C., and the last of the Asmoneans was put to death.

The reign of this foreign king, who acquired the name of "the Great" by maintaining himself amidst many difficulties, was of no advantage to the country. The doubtful character of his faith made the chief men, who were dependent on him, indifferent to their ancient religion, and the murders which he committed in his own family, as well as the unceasing oppression of the Romans, filled the people with general discontent. The divine worship degenerated into empty forms and the licentiousness of the court contaminated the nation. Such was the situation of Judaism when Christ was born. Herod survived this great event to stain his last days by the murder of the children of Bethlehem; but neither he and his successors nor the counsels of the Pharisees could avert the fate of the Jews. Under the feeble princes who succeeded Herod the country soon came to be treated merely as a Roman province. Oppressed by the procurators, precluded from the exercise of their religion, the infuriated people broke out into a rebellion (66 A.D.), which terminated in the total destruction of the Jewish state. On September 7, 70 A.D., Titus took Jerusalem by assault, burned the temple, demolished the city, and sold into slavery or drove into exile, all the inhabitants who escaped death.

About 110,000 Jews perished during the siege and at the destruction of Jerusalem. Those Jews who had taken refuge in the mountains and the ruins were compelled, after many unsuccessful efforts, to abandon their country, now changed into a barren desert. They found proselytes and old believers in all countries of the Roman Empire and in the E. as far as the Ganges, where those who had settled during the Babylonish captivity had greatly multiplied. Egypt and all the N. coast of Africa were filled with Jewish colonies, and in the cities of Asia Minor, of Greece and Italy were thousands enjoying the rights of citizens. They made themselves masters of the commerce of the Old World, and, as money lenders and brokers, were often of importance to princes and nobles; and during the persecutions which they underwent, even after the seventh century, they continued prosperous even during the periods in which they suffered most.

Restrictions of every conceivable description were placed on the Jews during the Middle Ages. In order to isolate them completely, Christians were forbidden to receive them at table, to bake for them, to make contracts with them, to be wet nurses for them, or to employ them as physicians. Jews were forbidden to show themselves on the street at Easter, to appear at market, to enter Christian baths, to bear witness against Christians, to live near churches, to own land. In cases of law a peculiar kind of oath was prescribed for them, and they were gradually forced to live in ghettos, from which they emerged only in the nineteenth century. They were to wear peculiar clothes or to carry a peculiar mark. When disputations failed to convince them of their errors, their books were burned or confiscated.

The end of the Middle Ages brought little relief. They were driven out from one country after another: from England, 1290; from France, 1182; from Germany, 1388, 1420, 1499, etc. Even in Spain, where, under the dominion of the Semitic Arabs, the Jews had risen to positions of honor and trust, they were driven out, 1492, to the number of 400,000. Portugal followed, 1506. A few countries were more tolerant—Turkey, Poland, and Holland. The French Revolution, 1792, began to usher in a new era for the Jews also. In spite of the Treaty of Berlin (1878), Jewish disabilities still exist in some of the Balkan states; and Russia, since 1882, has returned to the barbarism of the Middle Ages. Since 1880 other parts of Europe have also seen a revival of the old anti-Jewish feeling and an attempt to dignify the movement by calling it anti-Semitism. Through the short-sightedness of certain governments, it is true, economic conditions have at times been produced which have placed the Jews in unfavorable positions; where many centuries of exclusion from all handicrafts have driven the Jews largely into businesses connected with the loaning of money—in part placing the small landed proprietors and agriculturists in their power. This, combined with the religious hatred which still exists, was used by politicians and demagogues for party or personal motives. Starting thus as a political and anti-liberal movement, the seed grew more rapidly than its sowers ever had suspected—so much so that the anti-Semitic party had by 1891 made itself felt not only in the Reichstag, but in the social and literary life of the people also. From Germany it was imported into Russia, Austria, Greece, Holland, and France.

The oldest sects of the Jews were the Pharisees and Sadducees. In the time of Jesus were the Essenes, and, in the belief of some, the Therapeutæ, although the existence of the latter is denied. In the eighteenth century arose the Chasidim, a revival more in name than in spirit of those puritans of the post-exilic time, who strenuously resisted Hellenistic innovations. In the Middle Ages the Jews belonged to either one of two schools, Rabbinite, holding the traditional orthodoxy, or Karaite, holding the innovation, literal interpretation of Scripture, discarding Talmud and Midrash. These were the progenitors of the present Jewish sects, the Orthodox and the Reformed. The

Orthodox Jew cherishes the old hopes of a temporal Messianic kingdom and the restoration of the temple rites; he puts the Talmud alongside of the Bible, and observes the prescribed rites and ceremonies. The Reformed Jew discards the Talmud, acknowledges the vanity of the old national hopes, denies even that the Old Testament, when rightly interpreted, gives any support for such views, and in private and public worship departs widely from the traditions, nearly abrogating the ceremonial law and adopting in some synagogues, *e.g.*, in New York City, such distinct approaches to Christian ideas as uncovering his head in the synagogue, having family pews, vernacular services, even services on Sunday, Sunday schools, and the observance of Christmas.

The division of Jews into Ashkenazim and Sephardim is not doctrinal; the former are the Polish and German Jews, the latter the Spanish and Portuguese. They have different synagogues and a slightly different ritual, but agree in doctrine.

According to the "Jewish Year-book," the world's Jewish population (1900) was 11,723,940; Europe having 8,786,120; the Americas, 1,584,022; Africa, 402,602; Asia, 377,410, and Australia, 17,403. By countries, Russia had 5,082,342, Austria-Hungary, 2,076,277; the United States, 1,058,135; Germany, 586,940; Turkey, 282,277; Great Britain and Ireland, 228,707; Roumania, 200,000; the Netherlands, 103,988; France, 95,000; Italy, 35,617; Switzerland, 12,264, Greece, 8,350; Servia, 5,729; Norway and Sweden, 5,000, and Denmark, 3,476. Of late years the number living in Palestine has noticeably increased, and it was estimated that there were at least 100,000 there, chiefly engaged in agriculture. See JERUSALEM.

Jew, The Wan'dering. See WANDERING JEW.

Jew's'-harp, crude musical instrument named either because it was introduced by the Jews into England or in allusion to the use of the harp, as David's harp, among the Jews. It is made of metal, the frame being held against the teeth while an elastic tongue of steel is twanged by the fingers, different tones being produced by movements of the breath and variations in the size of the mouth cavity.

Jez'ebel, d. abt. 884 B.C.; daughter of Ethbaal, King of Tyre and Sidon, and wife of Ahab, King of Israel. She exercised a great influence upon her husband, leading him into idolatrous worship of Baal, a Phœnician deity. Many acts of persecution against the prophets and priests of Jehovah are attributed to Jezebel, and were so successful that at one time there were but 7,000 persons in Israel who had not bowed the knee to Baal. Jezebel was murdered by Jehu at the same time as her son, King Jehoram.

Jez'irah, one of the two chief cabalistic works of the Jews. Its date is variously assigned to the first and the eighth or ninth century.

Jezreel (jĕz'rē-ĕl), town in N. Palestine; in the tribe of Issachar, capital of the Kingdom of Israel under several reigns; was on the Plain of Esdraelon, often called the Plain of Jezreel. On its site is the modern village of Zer-in.

Jhansi (jăn'sē), city of central India, near the Betwa River; 68 m. SE. of Gwalior; capital of a district of Gwalior State; is an important manufacturing and commercial city. Pop. (1901) 55,724.

Jhelum (jē'lŭm), or **Jhelam** (jē'lăm), large river, the westernmost of the great affluents of the Indus in the Punjab; rises in the Vale of Kashmir; breaks through the Himalayas in the defile of Baramela, at an elevation of 4,000 or 5,000 ft., then has a generally S. course until it joins the Chinab; length about 500 m.

Jiddah (jĭd'dä), or **Jed'dah,** town in vilayet (province) of Hedjaz, Arabia, on the Red Sea; 48 m. W. from Mecca, of which city, as of the entire province, it is the port. Surrounded by a barren desert, dependent on scanty rainfalls for water supply, without productions of any kind, it is a great entrepôt where are exchanged gums, coffee, and especially mother of pearl, for rice, wheat, and the manufactured goods of Europe and India. Over 350 steamers touch here every year, and 50,000 or 60,000 pilgrims arrive by sea on their way to Mecca.

Jig'ger. See CHIGOE.

Jim'mu-Ten'no, Japanese semimythical personage; revered as the founder of the present dynasty. The date of his accession is placed at 660 B.C., and from this are the national records dated. He was fifth in descent from the sun, and originally bore the name of Kamu-Yamato-Ihare-Biko. The national holiday on February 11, known as Kigen-Setsu, is devoted to Jimmu's cult.

Jim'son Weed. See STRAMONIUM.

Jin'go-Ko'go, d. 269; Japanese ruler, who after the death of her husband the Emperor Juai, 201 A.D., governed Japan under the title of regent, on behalf of her son. She pacified S. Japan, where the barbarians (Kumaso) had risen in revolt, opened up relations with China, and exacted tribute from the kings of Shiraki, Korai, and Kudara, the three chief divisions of ancient Korea. Deified after death, she is now adored under the name of Kashi Dai-Miōjin.

Jinn (jĭn), imaginary beings in whose existence Mussulmans believe. In rank inferior to men, they are far superior in power. They are made of fire, and capable of assuming any form at will. Some are malevolent; others, called *peri* (fairy), benevolent. They are subject to Solomon, and sometimes to the prophet Mohammed. Anything inexplicable, as an ancient ruin, a tornado, an earthquake, is assigned to their agency.

Jinrik'isha, light carriage, popular in Japan, drawn by a human runner, who goes between the shafts. It carries one or two persons, and runs like a gig, on two wheels. Though dating only from 1868, or thereabouts, it is now in universal use over the empire.

Jirecek (yē'rĕt-chĕk), **Josef,** 1825–88; Bohemian author; b. Vysoke Myto; after engaging in journalism, held a position with the Minister of Education; was Minister of Education, 1871; removed to Prague and was elected to the Land Diet; became President of the Royal Bohemian Society of Sciences; wrote a handbook of the history of Bohemian literature, numerous essays on the literary history of his country, and republished many Bohemian works of the sixteenth and seventeenth centuries.

Jitomir (jĭt-tō-mēr'), or **Zhitomir',** capital of the government of Volhynia, Russia; on the Teteref; has a large commerce, especially in cereals; is a center of Jewish influence. The district of the same name has many foundries, glass factories, and other industrial establishments. Pop. (1900) 80,787.

Jiu Jit'su. See JU JITSU.

Jo'ab, son of Zeruiah, the sister of David; distinguished himself as a warrior under the reign of Saul, and was made commander of the whole Hebrew army by David; was a valiant, talented, and influential man, but violent and unscrupulous. When David tried to rid himself of him by giving the command to Amasa, Joab plunged his sword into Amasa's heart while embracing him. He took part in the unsuccessful demonstration in favor of Adonijah, and although he fled to the tabernacle for refuge, Solomon seized him and put him to death.

Joachim (yō'ä-chĭm), **Joseph,** 1831–1907; Hungarian violinist; b. Kittsee; began playing the violin at five years of age; spent his childhood and youth in studying under the best masters and playing in concerts; when thirteen years old, played with the London Philharmonic Society; in 1868 became head of the Berlin Academy of Music; made many concert tours and composed much for the violin.

Joan (jōn), **Pope,** fabulous personage who was long believed to have occupied the papal chair, 853–856, as John VIII. The report was that Joan was born in Germany, the daughter of an English priest; falling in love with a monk, she assumed male attire and entered a convent at Fulda, and then went with her paramour to Athens and Rome, where she acquired a high reputation for piety and learning, and was unanimously chosen pope when a vacancy occurred. One day in the street, at the head of a procession, the pope was unexpectedly delivered of a child, soon after which she died. The fable is utterly without historical foundation, the odd myth being no doubt only the shroud of a certain phase of popular resentment against the conduct of some mediæval popes.

Joanes (chō-ä'nĕs), **Vincente,** called also JUAN DE JUANES and VICENTE JUAN MACIP, 1523–79; Spanish painter; studied in Rome, imitated Raphael, and became the founder of a Spanish-Italian school of painters, whose seat was Valencia. His most celebrated pictures are in Valencia, as the "Madonna of the Immaculate Conception" in the Jesuits' church, the "Last Supper," the "Taking down from the Cross," and four others in the cathedral.

Joan'na I, 1326–82; Queen of Naples; daughter of Charles, Duke of Calabria, and granddaughter of Robert of Anjou; was married, 1333, to Andrew of Hungary, her second cousin; had him strangled, 1345, and married Louis of Taranto. Louis the Great of Hungary, brother of Andrew, invaded Naples to avenge his brother, whereupon Joanna fled to Avignon. She was afterwards reinstated in Naples through papal mediation. On the death of Louis of Taranto she married James of Aragon. For siding with Clement VII in the schism between him and Urban VI, Joanna was imprisoned and delivered to the King of Hungary, who put her to death.

Joanna II, 1371–1435; Queen of Naples; grandniece of Joanna I.; ruled 1414–35; was married to William of Austria, and after his death to Jacques de Bourbon; was notorious for her dissolute life.

Joannes (zhō-ăn'nĕs). See MARAJÓ.

Joannes Sco'tus. See ERIGENA.

Joannina (yō-ăn'ĭ-nä). See JANINA.

Joan (jō-ăn') **of Arc** (French JEANNE D'ARC), 1412–31; French national heroine; also called the MAID OF ORLEANS; b. Domrémy, Vosges; was of an ancient family reduced to a state of serfdom; at the age of thirteen, believed that she heard voices from heaven and saw visions of Saints Michael, Margaret, and Catharine, who called her to deliver her country, then overrun by the Anglo-Picard troops of the Duke of Bedford, regent of Henry VI, and by the forces of Burgundy; in 1429 gained an audience with the dauphin, who in April gave her command of the French troops; assumed male attire, a sword, and a white banner. She quickly raised the siege of Orleans, defeated the English in four engagements, and caused the dauphin to be crowned at Reims; then demanded to be released, the heavenly voices being no longer heard, but the king would not consent; in the subsequent attack on Paris was badly wounded, and soon after was ennobled, as was her family; was captured by the Burgundians, May 23, 1430, and was sold to the English (who feared her as a witch) for 16,000 fr.

After a year's imprisonment, was brought for trial as a sorceress and heretic before the tribunal of the Bishop of Beauvais. The Univ. of Paris having pronounced against her, she was condemned to be burned at the stake, but having consented to a formal abjuration of heresy, her life was spared for a time; falling soon afterwards under suspicion of renewing her errors, was burned in the market place of Rouen with every circumstance of indignity and cruelty May 30, 1431. In 1909 she was beatified by Pius X.

Jo'ash, d. abt. 823 B.C.; King of Israel; son and successor of Jehoahaz, and grandson of Jehu; became king abt. 838; successfully resisted the Syrians, and defeated Amaziah, King of Judah.

Joash, abt. 884-37 B.C.; King of Judah; son of Ahaziah. His brothers were murdered by his grandmother, Athaliah, who usurped the throne on Ahaziah's death, but he was saved by his aunt, the wife of the high priest Jehoiada; ascended the throne upon the death of Athaliah, and reigned forty years; fell into idolatry; was besieged in Jerusalem by Hazael of Damascus, giving up the temple treasures to the enemy; was murdered by his servants.

Job (Hebrew, "persecuted"), hero of one of the books of the Old Testament named from him; was a wealthy Arabian sheik or patriarch who dwelt in the land of Uz, and was benevolent, devout, and of blameless life. At an advanced age he was visited with loss of estate, of family, and of health; his wife broke down under the load of trials, but he remained true to God, and endured all without a single word of complaint, to the discomfiture of Satan, his tempter and accuser. He was visited by three friends who insisted that his adversity was proof of sin, and exhorted him to humility and submission, and for a time drove him from his patience. At last his faithfulness received an ample reward: he was blessed with children, wealth, and flocks and birds. The poem or drama is considered to be a wonderful specimen of literary art, and it is supposed that a historical fact lies at its basis.

Job's Tears, popular name of *Coix lacryma*, a grass, a native of India, where it often grows to the height of 8 ft. Its name is derived from its seeds or rather hardened husks, which are

Job's Tears

bony, shining, bluish white globules. In India the seeds are used for food, but outside of India they are used only as ornaments, made into bracelets and necklaces, or as beads for rosaries.

Jochmus (yoch'mus), **Jacob August** (Baron de Catignola), 1808-87; German military officer; b. Hamburg; entered the Greek army, took part in the capture of Missolonghi, and was made a captain, 1828; afterwards fought in Spain against the Carlists, and was made a brigadier general, 1837; in 1839-40 led the Turk's divisions in the Syrian campaign, and in 1849 acted as Minister of Foreign Affairs in the administration of Archduke John. In 1859 he was made lieutenant field marshal, and, 1866, field marshal, in the Austrian army.

Jodelle (zhō-dēl'), **Étienne, Sieur de Lymodin,** 1532-73; French dramatic poet; b. Paris; was a painter, sculptor, engraver, and architect as well as writer; composed original plays after the classical manner, including "Cleopatra in Captivity," regarded as the first French tragedy, "Dido"; the comedy "Eugene," and poems in French and in Latin; was one of the group called "the Pleiades."

Jodhpur (jōth'pōr), capital of a native state of the same name, in Rajputana, India; 110 m. WSW. of Ajmir; on an affluent of the Loni, a tributary of the Rann of Katch. The palace of the Maharajah is very fine, and is dominated by the citadel on a rock above. The town is surrounded by walls, and numerous lakes and ponds are interspersed with flourishing gardens and fields. The sacred city of Mahamandil is properly a suburb of Jodhpur, though it has a distinct government. Pop. (1901) 60,437.

Jo'el, one of the Hebrew minor prophets, of whom nothing is known, except from the book that bears his name. The book is a single prophecy. The situation it contemplates is marked by a threefold calamity: an invasion of locusts, a drought, and an invasion of enemies. In view of this, the prophet discourses concerning "the day of Jehovah," calls the people to fasting and repentance, and promises deliverance and the outpouring of Jehovah's Spirit.

Jogues (zhōg), **Isaac,** 1607-46; French missionary; b. Orleans; became a Jesuit at Rouen, 1624, and went to Canada as a missionary, 1636; after preaching to the Hurons, founded, 1642, a mission among the Chippewas in Michigan; on a journey to Quebec was captured by the Mohawks and made a slave, but escaped and went to France, whence he soon returned to Canada. In May, 1646, he concluded a treaty between the French and the Mohawks, and was put to death by the Mohawks as a sorcerer at Caughnawaga, October 18th of the same year. His "Letters" and his description of New Netherlands have been published.

Johann (yō'hän). See JOHN (JOHANN NEPOMUK MARIA JOSEPH).

Johannesburg (yō-hän'nēs-bōrg), largest town in the Transvaal, S. Africa, and the mining center of the Witwatersrand gold fields; 35 m. S. of Pretoria, and nearly 1,000 m. by rail from Cape Town. The city contains a technical institute, public library, stock exchange, banks, theaters, clubs, etc. Pop. (1904) 158,580.

Johan'nes Sco'tus. See ERIGENA.

Johannot (zhō-ä-nō'), **Tony,** 1803-52; French painter and illustrator; b. Offenbach, Hesse-Darmstadt; became a resident of Paris; illustrated Molière's works, the "Diable Boiteux" of Le Sage, "Don Quixote," Bernardin de Saint-Pierre's "Paul et Virginie," and "La Chaumière Indienne," the "Confessions" of

Rousseau, the "Contes" of Charles Nodier, Goethe's novel "Werther," etc. His brother, CHARLES HENRI ALFRED (1809–37), was also a painter and engraver.

John, name of twenty-three popes, of whom the following are the most important:

JOHN I, d. 526; b. Tuscany; succeeded Hormisdas, 523; was compelled by Theodoric the Ostrogoth to visit Constantinople and intercede for the Arians and was imprisoned on his return; commemorated in Roman Catholic Church May 27th.

JOHN XII, 938–64; b. Rome; son of Alberic and grandson of Marosia; succeeded Agapetus II, 956; changed his name from Octavian to John; believed to be the first pope to assume a new name on consecration; crowned Otho I, Emperor of Germany and King of Italy; deposed by Otho, 963, after condemnation by a council for murder, sacrilege, idolatry, and witchcraft, and Leo VIII chosen in his place; returned to Rome on Otho's withdrawal from Italy, displaced Leo, and committed many crimes.

JOHN XXII (JACQUES D'EUSE), abt. 1244–1334; b. Caharo; succeeded Clement V, 1316; was learned in the canon law, skilled in medicine, and remarkable for avarice; made his residence at Avignon; founded several abbeys; established new bishoprics; claimed the right to appoint a successor to the vacant throne of Germany; excommunicated Louis of Bavaria, and favored Robert, King of Naples; after long war between the Guelphs (Robert party) and Ghibellines (Louis party), the latter was crowned emperor by the bishops of Venice and Aleria, deposed John and appointed Peter de Corvara in his place as Nicholas V.

JOHN XXIII (BALTHAZAR COSSA), d. 1419; b. Naples; succeeded Alexander V, 1410; convoked the Council of Constance, 1413, which ordered him to abdicate; fled to Rome and attempted to resume his office; was arrested, returned to Constance, convicted of serious crimes, deposed, 1415, and imprisoned three years; succeeded by Martin V.

John I (JUAN), 1350–95; King of Aragon; married, 1384, Yolande, daughter of the Duke of Bar, granddaughter of John II the Good of France; succeeded to the throne on the death of his father, Peter IV, 1387; recognized Clement VII as pope at Avignon, and devoted himself to literature and pleasure; founded at Barcelona an academy of poetry on the model of the Floral Games of Toulouse; repelled the invasion of the Count of Armagnac, a pretender to the throne, 1390, and reconquered the island of Sardinia, 1392.

John II, 1397–1479; King of Aragon and Navarre; son of Ferdinand the Just; married, 1419, Blanche, daughter of Charles III of Navarre, and succeeded to the throne of that kingdom in right of his queen, 1425; accompanied his brother Alfonso V of Aragon in an expedition against Naples, in which both were taken prisoners by the Milanese in the naval battle of Ponsa, 1434; after his release, administered the government of Aragon in his brother's absence, and renewed his attempts to obtain supreme influence in Castile. The death of the queen, 1441, was followed by the rebellion of Prince Carlos, who claimed the throne of Navarre. John succeeded to the throne of Aragon, 1458; declared Sicily and Sardinia annexed to Aragon; unwillingly recognized his son as heir, but afterwards imprisoned him; made war against Louis X of France, 1473; was succeeded by his son Ferdinand, known as the Catholic.

John, 1166–1216; King of England; surnamed LACKLAND (*Sans Terre*), either as a younger or portionless son or on account of his loss of a large part of his French possessions; b. Oxford; son of Henry II.; was made feudal lord of almost one third of England by his brother, Richard Lionheart, and, 1199, succeeded the latter, who had ignored the claims of his nephew, Arthur; by a war with Arthur and Philip Augustus of France lost most of his territories in France. Soon after followed the controversy with Innocent III concerning the appointment to the vacant See of Canterbury, the excommunication and deposition of John, the letting loose of the armies of France upon England by the Pope, and the subjection to the latter of John. Indignation over this vassalage led the barons to riot and compel John, 1215, to sign Magna Charta, but he repudiated that charter. During the war that ensued he died.

John II, abt. 1319–64; King of France; surnamed the Good; son of Philip VI, founder of the Valois line; was crowned, 1350; in a war with England was taken prisoner by the Black Prince at Poitiers, 1356; was released, 1360, after surrendering several provinces and paying a ransom of 3,000,000 crowns; left in London as hostage his son, the Duke of Anjou, and when the latter escaped, in violation of his parole, returned to London as a prisoner, 1364, and there died.

John, name of several kings of Portugal, of whom the following are the most important: JOHN I (JOAO or JOAM), 1357–1433; surnamed THE GREAT; b. Lisbon; natural son of Peter I and brother of Ferdinand, at whose death, 1383, he became regent and seized upon the throne. John I of Castile, who had married the Infanta Beatrice, made war to enforce her rights, but was defeated at Aegubarotta, 1385. John took Ceuta from the Moors, 1415. JOHN II, 1455–95; surnamed THE PERFECT; b. Lisbon; married Leonora of Lancaster, 1471; succeeded his father, Alfonso V, 1481; refused the services of Columbus, but after the discovery of America sent a fleet thither; promoted the exploration of the coasts of Africa by great navigators, one of whom, Bartholomew Diaz, discovered the Cape of Good Hope. JOHN IV, 1604–56; surnamed THE FORTUNATE; b. Villaviciosa; was Duke of Braganza, and by a revolution overthrew the Spanish usurpation in Portugal, 1640, placing himself on the throne; until his death kept up hostilities with Spain. JOHN VI, 1767–1826; b. Lisbon; married Charlotte (Carlotta), Infanta of Spain, 1785; named Prince of Brazil, 1788; governed the kingdom in consequence of his mother's illness, 1792; assumed the title of regent, 1799; warred with Spain and France; removed, with

his court, to Brazil, 1807, on the approach of the French army of occupation; formed an alliance with England, and was a party to the Treaty of Paris, 1814; became king on his mother's death, 1816; returned to Portugal, 1821, modified the constitution, 1823; recognized the independence of Brazil, 1825.

John II (CASIMIR), 1609-72; King of Poland; was the second son of Sigismund III; entered, 1640, the order of the Jesuits, and was made a cardinal soon after; succeeded to the throne on the death of his stepbrother, Ladislas, 1648. His reign was unfortunate. To the Elector of Brandenburg he abandoned all seigniorial rights in E. Prussia, to Sweden he lost Esthonia and Livonia, and to Russia, by the peace of Andrussov, 1667, White and Red Russia. His government was distracted by the feuds and intrigues of the nobles, and, unable to master the situation, he abdicated, 1668; went to France and lived in retirement.

John III (SOBIESKI), 1624-96; King of Poland, b. Olesko, Galicia; distinguished himself so much in the wars against the Swedes, Russians, and Transylvanians that, 1667, he was made commander in chief of the whole Polish army. The successor of John II, Michael Korybut, having made a humiliating treaty with the Turks, Sobieski had it rejected by the Polish Diet, headed an army against the Turks, and routed them at Khotin, 1673. Soon afterwards Michael Korybut died, and Sobieski was unanimously elected King of Poland (1674). His greatest achievement was his victory (September 12, 1683) over a vastly superior force of Turks who were besieging Vienna.

John (JOHANN BAPTIST JOSEPH FABIAN SEBASTIAN), 1782-1859; Archduke of Austria; b. Florence, Italy, son of Leopold II and Maria Louisa of Spain; commanded the Austrian armies, 1800, 1803, 1805, and 1809, but was generally unsuccessful; was chosen Reichsverweser by the Parliament of Frankfort; was a most obstinate defender of the interests of the house of Austria, and, as these did not always coincide with the interests of the German people, he resigned, 1849.

John (JOHANN NEPOMUK MARIA JOSEPH), 1801-73; King of Saxony; youngest son of Duke Maximilian of Saxony and the Princess Caroline of Parma; was commander of the National Guard 1831-46. His brother, Frederick Augustus II, dying without issue, August 9, 1854, he became king. In the war of 1866 he took the side of Austria. The Prussians entered Saxony, and the Saxon army, having withdrawn to Bohemia, fought against them in the battle of Königgrätz, July 3. Peace was concluded between Prussia and Saxony, October 21, and the king agreed to pay a large sum and to cede the fortress of Königstein. Subsequently Saxony entered the N. German Confederation and her troops took part in the Franco-Prussian War of 1870-71. Under the pseudonym of "Philalethes" John published a translation of Dante's "Divina Commedia," with critical and historical notes. He left manuscript translations of seventy English poems.

John Do'ry. See DORY.

John Fred'erick, 1503-54; Elector of Saxony; surnamed THE MAGNANIMOUS; b. Torgau; was son of John the Constant, on whose death, 1532, he became administrator in the joint names of himself and his younger brother, John Ernest; was recognized as elector by the emperor at Vienna, 1535, and in 1546 headed the armies of the Schmalkaldic League in the contest with Charles V, by whom he was defeated at Mühlberg, being taken prisoner and condemned to death, but was spared on condition of renouncing his claims to the electorate. He was liberated, 1552, upon the renewal of the war under the leadership of his cousin, Maurice of Saxony; succeeded to the full title by the death of his brother, John Ernest, 1553.

John George I, 1585-1656; Elector of Saxony; succeeded his brother, Christian II, 1611; supported the Emperor Ferdinand against the Bohemians, 1620, at the outset of the Thirty Years' War; formed an alliance with Gustavus Adolphus, King of Sweden, 1631; contributed to the victory of Leipzig, and took Prague, but lost it, with all Bohemia, to Wallenstein, 1632; made peace with the emperor at Prague, 1635, and declared war against Sweden; was defeated by the Swedes at Domnitz and at Witstock, 1636; aided the imperialists against France in the battle of Dutlingen, 1643.

John of Aus'tria, generally called DON JOHN OF AUSTRIA, 1545-78; Spanish military officer; b. Ratisbon, Bavaria; natural son of Charles V and Barbara Blomberg; was educated in Spain; after the death of Charles V, 1559, was publicly acknowledged by Philip II as his brother and established in princely state; led a successful expedition against the African pirates, 1568; subdued the Moorish rebellion in Granada, 1569-70; commanded the Spanish-Italian armament against the Turks, 1571, and won the great naval battle of Lepanto; conquered Tunis, 1573; became vice regent in The Netherlands, 1576; declared war against the rebellious provinces under William of Orange, 1578.

John of Gaunt, or **Ghent,** 1340-99; Duke of Lancaster; fourth son of Edward III of England; b. Ghent; defended Wycliffe, and was often suspected of aiming at the crown. His son by Blanche Plantagenet became king as Henry IV, 1399. John de Beaufort, Earl of Somerset, his son by Catharine Swynford, his mistress (afterwards his third wife), was an ancestor of the Tudors.

John of Leyden (lī'dĕn), 1509-36; Dutch fanatic; true name, JOHN BOCCOLD, or BOCKELSON. In 1533 he joined the Anabaptists at Münster, where he assisted Matthias of Haarlem, and after his death assumed power as a prophet. He was crowned as King of Zion, June 24, 1534; assumed princely state and luxury, and introduced polygamy, marrying fifteen wives. The city was besieged by the Bishop of Münster and taken by treachery in the night of June 24, 1535. John was made prisoner, sent through the country in an iron cage, and finally tortured to death.

John of Salisbury (sâlz'bér-ĭ), called also JOHANNES PARVUS (John the Little), 1115–80; English scholastic-philosopher; was the secretary of Becket; was called his eye and his arm, and supported him in the contest with Henry II. In 1176 he was elected Bishop of Chartres, where he passed the rest of his life. He was highly reputed as a scholar, poet, and orator.

John of Swabia (swā'bĭ-ä), or **John the Par'ricide,** 1289–1368; German prince; son of Duke Rudolph of Swabia and nephew of the Emperor Albert I. As the emperor would not surrender to him his hereditary possessions on his attaining his majority, the prince entered into a conspiracy with discontented noblemen, and murdered him, May 1, 1308, near Windisch, Switzerland. The murderers all escaped, John fleeing to Italy. The statements about his fate there are conflicting and untrustworthy. The emperor's daughter Agnes, widow of Andrew III of Hungary, and her mother, the Dowager Empress Elizabeth, doomed to death thousands of the innocent relatives, friends, and vassals of the conspirators, confiscating their property.

John the Bap'tist, son of the priest Zacharias and Elizabeth, a cousin of the mother of Jesus. John was born six months before Jesus. In the fifteenth year of the reign of Tiberius (26 A.D.) he began to preach in the deserts of Judea, announcing the coming of the Messiah, admonishing to repentance, and baptizing as a symbol of purification from sin. Very little is known of him from other sources than the Gospels. He was imprisoned and beheaded by order of Herod Antipas in the Castle of Machærus, E. of the Dead Sea, perhaps early in 29 A.D. In the Christian Church, June 24th is commemorative of his birth.

John the Con'stant, 1468–1532; Elector of Saxony; distinguished himself in the war against the Hungarians; succeeded his brother, Frederick the Wise, 1525, and put an end to the Peasants' War in his own dominions; formed an alliance with the landgrave, Philip of Hesse, and other princes, in support of the principles of the Reformation; protested, 1529, against the decision of the Diet of Spires adverse to the Reformation, and was influential in causing the proclamation of the Augsburg Confession. Still later he helped to form the League of Schmalkald.

John the Evan'gelist, one of the twelve apostles; son of the fisherman Zebedee and Salome; was "the disciple whom Jesus loved," and the only one who accompanied Him to the cross. After the ascension John remained for a while at Jerusalem, but from this time Scriptural history is silent concerning him. The traditions agree that he afterwards abode in Asia Minor. According to Jerome, he was banished in the year 95 to the island of Patmos, was released, and died at a very advanced age. A Gospel, three epistles, and the book of Revelation bear his name. His Gospel gives the speeches of Christ more fully than the synoptic Gospels. The subject of its genuineness is discussed by Bretschneider, Strauss, Baur, Schwegler, and others, from a rationalistic standpoint; while it has been defended by Tholuck and others of note.

John the Fear'less (Duke of Burgundy), abt. 1370–1419; succeeded his father, Philip the Bold, 1404. To preserve the leadership of his house in French affairs, he had the Duke of Orleans murdered, 1407, which caused a civil war. In 1416 he entered into a secret alliance with Henry V of England, and soon overran a great part of France, and obtained possession of the king's person. He was invited to meet the dauphin on the bridge of Montereau, and assassinated.

Johns Hop'kins Univer'sity, institution in Baltimore, Md.; endowed by Johns Hopkins with a bequest of more than $3,000,000, including his estate known as Clifton, in Baltimore County; was chartered by the State of Maryland, with power to confer degrees, and opened for instruction, 1876. The university possesses a large and valuable collection of apparatus selected with especial reference to investigation. The following serials are issued under the auspices of the university: *American Journal of Mathematics, American Chemical Journal, American Journal of Philology, Memoirs from the Biological Laboratory, Studies in Historical and Political Science, Contributions to Assyriology, Modern Language Notes, Journal of Experimental Medicine, Johns Hopkins University Circulars.* Instruction is provided in ancient and modern languages; in history, political science, and philosophy; in mathematics, astronomy, physics, chemistry, geology, and mineralogy; in zoölogy, physiology, pathology and bacteriology, anatomy, physiological chemistry, pharmacology and toxicology, general medicine, surgery, gynæcology, obstetrics, etc. In connection with the Johns Hopkins Hospital, opened 1889, the medical school offers courses for graduates in medicine. The university has over 130,000 volumes in its library, scientific apparatus valued at over $175,000, grounds and buildings valued at $1,180,000, productive funds $4,845,000, annual income over $300,000, about 175 instructors, and over 700 students in all departments.

John'son, Andrew, 1808–75; seventeenth President of the U. S.; b. Raleigh, N. C.; after working as a journeyman-tailor, removed, 1826, to Greenville, Tenn.; was "workingmen's" alderman, 1828–30, and mayor, 1830–32. He was chosen to the lower house of the Legislature as a Democrat, 1835, 1839; was a candidate for Presidential elector-at-large, 1840, and canvassed the state for Van Buren; was elected State Senator, 1841. He was a Representative in Congress, 1843–53, and supported the administrations of Tyler and Polk; Governor of Tennessee, 1853–57; and U. S. Senator, 1857–62. He did everything in his power to keep Tennessee in the Union, and was military governor of that state, 1862–64. In 1864 he was elected Vice President on the ticket with Lincoln, and on the latter's assassination, 1865, succeeded to the Presidency. He was soon involved in a bitter feud with the Republican majority in Congress, and by his policy of reconstruction

brought the two highest branches of the government into open antagonism. He removed Mr. Stanton, Secretary of War, 1867, in spite of the Tenure of office Act previously passed, replacing him by Gen. Grant, and when Stanton resumed office, 1868, sustained by the Senate, the President made another, but unsuccessful, effort to remove him.

He was impeached, 1869, for "high crimes and misdemeanors," chiefly on the ground of his resistance to the execution of the acts of Congress and his public expressions of contempt for that body, but was acquitted May 16 and 26, the votes on the two leading articles standing 35 guilty to 19 not guilty. He sought, but failed, to obtain a nomination for reëlection by the Democratic party, though he received 65 votes on the first ballot, and on the accession of President Grant, 1869, retired to Greenville. He was reëlected to the U. S. Senate, 1875, and two weeks after the session began made a bitter attack on the President. Among the measures enacted during his administration, but over his veto, were those extending the right of suffrage to the freedmen, dividing the S. States into military districts and excluding them from self-government until they should have ratified the late amendments to the Federal Constitution, and until they should have adopted state constitutions in accordance therewith.

Johnson, Eastman, 1824-1906; American genre and portrait painter; b. Lovell, Me.; studio in New York; became a National Academician, 1860; member Society American Artists, 1881; received third class medal at Paris Exposition, 1887. "Old Kentucky Home" and "Husking Bee" are two of his best-known works.

Johnson, Isaac, d. 1630; one of the founders of Massachusetts; b. Clipsham, Rutlandshire, England; married Arabella, daughter of the Earl of Lincoln, who accompanied him to New England with Winthrop's colony, 1630. He assisted in founding a church at Charleston, July 30th, same year, and superintended the settlement of Shawmut (Boston), to which the colony removed in September.

Johnson, Sir John, 1742-1830; British military officer; b. near Johnstown, N. Y.; son of Sir William Johnson; was knighted, 1765; succeeded, 1774, to his father's great estates and influence in the Mohawk Valley; in 1776 fled to Canada with 700 followers; raised two battalions called the Royal Greens; was commissioned colonel, invested Fort Stanwix, 1777; defeated Gen. Herkimer, and was himself defeated, 1780. His property was confiscated by the U. S., but the British Govt. made him grants of lands in Canada, where he became a member of the Colonial Council, and was superintendent of Indian affairs until his death at Montreal.

Johnson, Manuel John, 1805-59; English astronomer; served with the East India Company's artillery at St. Helena, 1821-32; prepared a catalogue of 606 stars of the southern hemisphere; was appointed Radcliffe astronomer, 1839, greatly extended the lists of stars by his annual catalogues, and introduced improved astronomical instruments. His observations of double stars with the great heliometer and his photographic registration of stars were especially important. He was president of the Royal Astronomical Society, 1857-58.

Johnson, Percival Norton, abt. 1793-1866; English metallurgist; son of a London assayer; was the first to determine with accuracy the exact proportions of gold and silver in bullion; introduced into England from Germany the alloy known as German silver; extracted palladium and platinum from gold bullion, and manufactured them for commercial purposes, and invented several pottery colors, especially the much-admired rose-pink.

Johnson, Reverdy, 1796-1876; American jurist; b. Annapolis, Md.; admitted to the bar, 1815; removed to Baltimore, 1817, and was shortly after appointed Deputy Attorney General of Maryland; State Senator, 1821-25; Whig U. S. Senator, 1845-49; U. S. Attorney General, 1849-50; member of Peace Convention, 1861; U. S. Senator, 1863-68; Minister to England, 1868-69; negotiated a treaty for the settlement of the Alabama claims, which was rejected, however, by the U. S. Senate; resumed private practice.

Johnson, Richard Mentor, 1780-1850; Vice President of the U. S.; b. near Louisville, Ky.; admitted to the bar; member of Congress, 1807-19; fought with distinction in the War of 1812; U. S. Senator, 1819-29; again member of the House, 1829-37; elected Vice President by the Senate, 1837. He was the author of the law abolishing imprisonment for debt in Kentucky.

Johnson, Samuel, 1696-1772; American educator; b. Guilford, Conn.; became a tutor in Yale College; was ordained pastor of the Congregational Church at West Haven, 1720, but, 1722, sailed to obtain orders in the Church of England; on return was settled at Stratford as a missionary of the Society for the Propagation of the Gospel in Foreign Parts; was a profound philosopher for his day, comprehending Berkeley and going deeply into Hutchinsonianism; published a "System of Morality"; a new edition, under the title of "Elementa Philosophica," was printed by Benjamin Franklin, 1752. In 1753-63 he was president of King's College, New York.

Johnson, Samuel, 1709-84; English author; b. Lichfield, Staffordshire; son of a bookseller; was for a time usher in a school at Market Bosworth, Leicestershire; afterwards lived at Birmingham, writing for a newspaper, and conducted a private academy near Lichfield, 1736-37. In 1737 he removed to London, and was a writer for Cave's *Gentleman's Magazine* until 1754. He came into larger notice by the publication of "London," a satire, imitated from Juvenal, and of some political pamphlets; became a reporter for the *Gentleman's Magazine* of the debates in Parliament, 1740; published "Life of Savage," 1744; his best poem, "The Vanity of Human Wishes," 1749, and a heavy drama, "Irene," and 1750-52 wrote "The Ram-

bler," a semi-weekly series of literary essays, which had great success. In 1747–55 he was chiefly occupied on his great work, the "Dictionary of the English Language."

His mother died, 1759, and to pay the funeral expenses he wrote "Rasselas" (originally "The Prince of Abyssinia"), a moral apologue, which went through eight editions in his lifetime within a single week. The "Idler," an imitation of "The Rambler," appeared 1758–60; the "Dictionary," 1755, and he soon received a pension of £300 and acquired a settled position in the world of letters. He visited Scotland and the Hebrides, 1773, accompanied by his future biographer, Boswell; published, 1775, "Journey to the Western Islands," and a pamphlet against the American rebellion, entitled "Taxation No Tyranny," and, 1779–81, "Lives of the Poets," his last important work. He was buried in Westminster Abbey.

Johnson, Sir William, 1715–74; British general and statesman; b. Warrentown, Ireland; went, 1738, to North America to manage landed estates belonging to his uncle, Admiral Sir Peter Warren, and settled among the Mohawk Indians, by whom he was made an honorary chieftain. In 1743 he was appointed superintendent of Indian affairs for the province, and held this post for the remainder of his life. In the French war of 1755 he was commander in chief of the provincial forces in the expedition against Crown Point, in which he defeated Baron Dieskau at Lake George; was given the thanks of Parliament, a grant of £5,000, and a baronetcy. In 1756–57 Sir William was engaged in the expeditions for the relief of Oswego and Fort William Henry; was with Abercrombie at Ticonderoga, 1758, and was second in command under Prideaux in the expedition against Fort Niagara, 1759; on the death of Prideaux, prosecuted the siege, aided by 1,000 Indian allies; defeated a French force sent to relieve the fort; and received its unconditional surrender. In 1760 he participated in Amherst's expedition to Montreal. For these services he received from the king a grant of 100,000 acres of land N. of the Mohawk, long known as Kingsland, or the Royal Grant, and, 1764, he built Johnson Hall, around which soon sprang up the village of Johnstown. He made the Indian treaty of Fort Stanwix, 1768.

Johnson, William Samuel, 1727–1819; American legislator; b. Stratford, Conn.; son of Rev. Dr. Samuel Johnson; was admitted to the bar; member of the Colonial Congress that met in New York, 1765, to consider the Stamp Act, and drew up the petition and remonstrance that were sent to the king and Parliament; counsel for Connecticut in a cause pending before the king and lords in council concerning the title to a large tract of land obtained from the Mohegan Indians. He was a delegate to the convention which framed the Federal Constitution, and president of the committee appointed to revise the style of the instrument and arrange its articles; proposed the organization of the Senate as a separate body; was elected the first Senator from Connecticut; and in concert with his colleague, Oliver Ellsworth, drew up the bill to organize the judiciary. After King's College, New York, became Columbia under the new organization of trustees established 1787, he was chosen to the presidency —an office which his father had filled under the royal charter.

John'ston, Albert Sidney, 1803–62; U. S. military officer; b. Washington, Ky.; graduated at West Point, 1826; served in the Black Hawk War; resigned and, 1836, emigrated to Texas; entered the Texan army as a private and rose to chief command, holding the office till 1838; became Secretary of War for Texas. In the war with Mexico, 1846, he first commanded the Texan Volunteer Rifle Regiment; later was inspector general on the staff of Gen. W. D. Butler, and distinguished himself at Monterey. He was reappointed as paymaster in the army with rank of major, 1849; commissioned colonel Second U. S. Cavalry, 1855; commanded military force sent to Utah to compel Mormon obedience to Federal authority; breveted brigadier general. He resigned, 1861; was appointed a general in the Confederate army, and assigned to an important command in the West; was commander-in-chief at the battle of Shiloh, and on the first day of that engagement was killed. A bronze equestrian statue of him was unveiled in Metairie Cemetery, New Orleans, 1887.

Johnston, Alexander Keith, 1804–71; Scottish geographer; b. Kirkhill; learned engraving in Edinburgh; principal works are his "National Atlas," "Physical Atlas," "Dictionary of Geography," "Geological Map of Europe," "Atlas of North America," "Military Atlas to Alison's Europe," "Royal Atlas of Modern Geography," and a series of six library maps of the great divisions of the globe.

Johnston, George, 1798–1855; Scottish naturalist; b. Simprin; practiced medicine at Berwick on Tweed; most important works, "History of British Zoöphytes," "History of British Sponges and Lithophytes," "Introduction to Conchology," and "The Natural History of the Eastern Borders."

Johnston, James F. W., abt. 1796–1855; Scottish chemist; b. Paisley; was for many years a classical and scientific teacher at Glasgow and Durham; became reader in chemistry and mineralogy at the Univ. of Durham, and prepared numerous treatises on agricultural chemistry, most of which have had a wide circulation in the U. S.; his works include "Elements of Agricultural Chemistry and Geology"; "Catechism and Lectures," on the same sciences; "Notes on North America," and "Chemistry of Common Life."

Johnston, Joseph Eccleston, 1807–91; American military officer; b. near Farmville, Va.; graduated at West Point, 1829, and served in the Seminole War. During the Mexican War he was a captain of topographical engineers under Gen. Scott in all the important actions, was twice wounded, and was breveted colonel. In June, 1860, he became quartermaster general, U. S. A., with the rank of brigadier general; 1861, resigned and entered the Con-

federate service; and commanded at the battle of Bull Run, and subsequently at Yorktown and Richmond. In the battle of Seven Pines (May 31, 1862) he was severely wounded. He was afterwards assigned to the command of the departments of Tennessee and Mississippi. After Bragg's defeat at Chattanooga in November, 1863, he took command of his army, occupying a position at Dalton, Ga., which was turned by Sherman early in May, 1864; whereupon Johnston fell back successively to Resaca, Allatoona Pass, Kenesaw Mountain, and Atlanta, in turns fighting and flanked. In July he was superseded by Gen. John B. Hood. In February, 1865, he was assigned to the command of troops to oppose Sherman's march through the Carolinas. He fought a part of Sherman's army at Bentonville, N. C., on March 19th, and surrendered the forces under his command to that general, April 26th, at Durham's Station, near Greensboro, N. C. He was a member of Congress, 1876-78, and U. S. Commissioner of Pacific Railways, 1885-89; published a "Narrative of Military Operations."

Johnston, Richard Malcolm, 1822-98; American novelist; b. Hancock Co., Ga.; began law practice at Sparta, 1843; was Prof. of Belles Lettres in the Univ. of Georgia, 1857-61; then established a select classical school at Rockby, which became famous in the S. states; 1867, moved his school to Chestnut Hill, near Baltimore, Md., where it became known as Pen-Lucy Institute; publications include "Historical Sketch of English Literature," the "Dukesborough Tales," "Biography of Alexander H. Stephens," "Old Mark Langston," "Ogeechee Cross-firings."

Johnstown, city in Cambria Co., Pa., on the Conemaugh River; 79 m. E. of Pittsburg; is engaged in the manufacture of iron, steel, wire, cement, fire brick, and leather and woolen goods. On May 31, 1889, a dam on the Little Conemaugh River, 9 m. above the city, broke away during an extraordinarily heavy rainfall. The impounded water added to the already overflowing streams swept over the city, destroying property of an estimated value of $10,000,000, and causing a loss of life estimated at from 2,300 to 5,000. The city has been rebuilt, and restored to its former prosperity. Pop. (1906) 43,250.

Joint, in anatomy, an articulation, or the connection existing between the several bones of the skeleton. The tissues entering into its formation are bones, the ends of which are covered by cartilage, and bound together by ligaments; in the more movable a membranous sac is interposed, which secretes a lubricating fluid called synovia. The construction of joints differs, according to the function which they have to perform, and may be divided into three classes, viz., the immovable, those permitting limited motion, and the movable. The latter, which are the most important, are of several types, as the ball and socket, the hingelike, etc. Joints are liable to a number of diseases of an inflammatory type, which, like rheumatism and gout, result from some general bodily condition, or, like ordinary synovitis, from injury to the joint. If the inflammation is serious the underlying bones may be involved, and

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finally the joint may be destroyed, the bones becoming united by firm adhesions.

Joint'-firs, popular name of gymnospermous plants belonging to the order *Gnetaceæ*, which is closely related to the *Coniferæ*. The species are thirty-six in number. They are small trees and shrubs, mostly belonging to the genera *Gnetum* and *Ephedra*, and natives of tropical and warm countries. Their stems are jointed, their juices not resinous, but watery, or sometimes gummy. Several species grow in the SW. part of the U. S. The curious Welwitschia (*Tumboa bainesii*), a native of SW. Africa, has a stumplike stem bearing two long strap-shaped leaves, and clusters of scarlet cones.

Joint'-rush. See HORSETAIL.

Joint'-stock Com'pany. See CORPORATION.

Joinville (zhwăñ-vēl'), **François Ferdinand Philippe Louis Marie d'Orleans** (Prince de), 1818-1900; b. Neuilly; third son of Louis Philippe; served in the navy, and became captain for gallantry in the attack on Vera Cruz, 1838; was sent to St. Helena to convey the remains of Napoleon to France, 1840; married the Princess Francesca di Braganza, sister of the Emperor of Brazil, 1843; commanded the fleet which bombarded Tangiers and seized Mogador, 1844. He came to the U. S., 1861, with his nephews, the Comte de Paris and the Duc de Chartres, who served on the personal staff of Gen. McClellan in Virginia, and himself accompanied McClellan, who gladly availed himself of his military experience; on his return, published in the *Revue des Deux Mondes* a sketch entitled "The Army of the Potomac"; during the Franco-Prussian War secretly entered the army under the pseudonym of Col. Lutherod, but was detected and compelled to return to England, where his family had resided since 1848; returned to France,

1871. He also published "Note on the Naval Forces of France," "Studies on the Navy and War Stories," and "Recollections."

Jokai (yō'koi), **Mór,** 1825–1904; Hungarian novelist; b. Komorn; when only seventeen years old published his first drama, "The Jew Boy," and, 1845, his first novel, "Working Days"; founded the *Fatherland*, a daily political paper, 1863; later became the editor of *The Comet*, the leading weekly humorous paper of Budapest; published, besides dramas, about 200 volumes of romances and novels, including "A Hungarian Nabob," "The Accursed Family," "The New Landlord," "Last Days of the Janissaries." His wife was a famous actress, Rosa Laborfalvi.

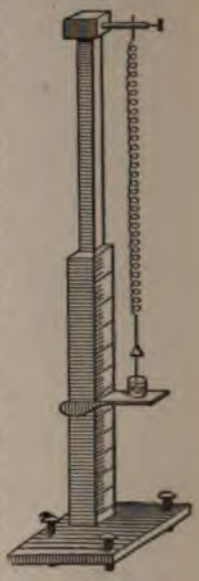
Joliba (jŏl'ĭ-bä). See NIGER.

Joliet (zhō-lē-ā'), **Louis,** 1645–1700; Canadian explorer; b. Quebec; was educated in the Jesuits' College there, but engaged in the Western fur trade. Commissioned by Frontenac to explore the Mississippi River, he was the first to ascertain (1673) that the Mississippi flows to the Gulf of Mexico and not to the Pacific, as was then generally supposed. Joliet returned no more to the Mississippi, his further explorations leading him to Labrador and Hudson Bay. He was appointed royal hydrographer and received the island of Anticosti, of which he was deprived by the British. In 1697 the seigniory of Joliet in Canada was granted to him.

Joliet (jō'lĭ-ĕt), capital of Will Co., Ill.; on Des Plaines River and the Illinois and Michigan Canal; 36 m. SW. of Chicago; is built mainly in the river valley, but partly on bluffs on either side. Very fine calcareous building stone underlies the whole city and vicinity, and is extensively quarried. Cement, gravel, and fireclay are largely obtained, the latter being utilized in the manufacture of firebrick and drain tile. The principal industries are the manufacture of foundry and machine-shop products, steel rails, wire, Corliss engines, agricultural implements, clocks, stoves, flour, lime, and shoes, and marble and stone quarrying and working. Noteworthy buildings are the state penitentiary, Silver Cross and St. Joseph's hospitals, Masonic Temple, St. Francis and St. Mary academies, Swedish Orphan Home, public library, and the Illinois Steel Company's clubhouse for its operatives. Near the city are productive coal mines. The city owns its water-works plant, contains numerous artesian wells, and obtains valuable water power for manufacturing from the canal. Pop. (1906) 32,185.

Jolin (yō'lĭn), **Johan Kristoffer,** 1818–84; Swedish dramatist, novelist, and poet; was an actor in the Royal Theater, Stockholm, 1846–48; also literary reader of the theater, and, 1857–68, chief of its school of acting; works include the dramas, "The Foundling Boys," "The Miller's Miss," "A Man of the World and a Man of Worth," and the poem, "The Mountain Bride."

Jolly (yŏl'ē), **Philipp Gustav von,** 1809–84; German physicist; b. Mannheim; became Prof. of Physics in the Univ. of Heidelberg. In 1854 he was appointed to a similar position in the Univ. of Munich, where he remained till death. He was the author of many papers on experimental physics, and was especially noted for his work on the density of substances and on heat. He invented the Jolly balance, a device for determining the density of small solids, such as specimens of minerals, by weighing in air and water.



JOLLY BALANCE.

Jomelli (yō-mĕl'lē), **Nicolo,** 1714–74; Italian composer; b. Naples; produced his first opera, "L'Errore Amoroso," 1737; visited Vienna, where he became acquainted with Metastasio, and produced his best opera, "Didone"; was in 1754 appointed chapel master to the Duke of Würtemberg; but when, in 1767, he returned from Stuttgart to Naples, he had adopted so much of the German style in his method of composing that his countrymen hissed his new opera, "Armida," off the stage. His last composition was a "Miserere."

Jomini (zhō-mē-nē'), **Henri,** 1779–1869; Swiss military writer; b. Payerne; served as aide-de-camp to Marshal Ney in Germany and Spain; was made a brigadier general, 1808, and distinguished himself on the retreat from Moscow, 1812; was afterwards aide-de-camp to Emperor Alexander of Russia, and distinguished himself in the war against the Turks, 1828; works include "Treatise on Great Military Operations," "Critical and Military History of the Campaigns of the Revolution," and "Political and Military Life of Napoleon."

Jomard (zhō-mär'), **Edme François,** 1777–1862; French geographer and archæologist; b. Versailles; 1798, accompanied an expedition to Egypt as a member of the scientific committee; after his return to Paris, 1802, was employed for more than twenty years in editing and publishing the celebrated work, "Description de l'Egypt," of which he wrote six volumes himself. In 1821 he assisted in founding the Geographical Society of Paris; after 1828 held a position in the geographical department of the Royal Library, and aided in the publication of many valuable works concerning Egypt and Africa.

Jo'nah, fifth of the minor Hebrew prophets; prophesied in the kingdom of Israel under Jeroboam II. Being divinely commanded to go to Nineveh and denounce its wickedness, and fearing to undertake the mission, he embarked at Joppa for Tarshish. He was overtaken by a tempest, thrown overboard, and swallowed by a great fish, within which he lived three days and three nights, when he was

ejected. He afterwards fulfilled his mission, bringing the Ninevites to repentance. Various allegorical and mythical interpretations have been advanced by modern critics.

Jonas (yō'nās), **Justus,** originally JOBST KOCH, 1493-1555; German Protestant reformer; b. Nordhausen, Prussia; became Prof. of Jurisprudence at Erfurt, 1516; changed his chair for that of theology, 1519, and as Prof. of Theology went to Wittenberg, 1521; became ecclesiastical superintendent at Halle, 1541; court preacher at Coburg, 1551, and superintendent at Eisfeld, 1553; was one of the most prominent among the German reformers; accompanied Luther to Worms, aided him in the translation of the Old Testament, and contributed much to the Reformation by his preaching and his translations of the Latin writings of Luther and Melanchthon.

Jon'athan, son of Saul, King of Israel; became, on the establishment of the kingdom, a conspicuous leader in the wars against the Philistines. His attachment to David, whom he defended against the murderous designs of his father, is the best known feature of Jonathan's career, and has made his name a synonym for disinterested friendship. Jonathan was killed in battle against the Philistines at Mt. Gilboa, and his body was exposed on the walls of Beth-shan until it was secretly carried away and buried by the men of Jabesh-Gilead, and his remains were ultimately placed in the family sepulcher at Zelah.

Jones, Inigo, 1572-1651; architect; b. London. He was appointed by Christian IV of Denmark to be his architect. He was a great favorite of James I, and a stanch Royalist. His principal works are the banqueting house at Whitehall, a magnificent palace for the queen mother at Greenwich; also Greenwich Hospital, the portico of St. Paul's Church, the Royal Exchange, and many palaces. He also wrote treatises on architecture and ancient buildings.

Jones, Jacob, 1770-1850; American naval officer; b. near Smyrna, Del.; entered the navy, 1799; became lieutenant, 1801; was captured off Tripoli, 1803, and remained a prisoner twenty months; was commissioned master commandant, 1810, and, 1811, was appointed to the command of the *Wasp*, with which, 1812, he captured the British sloop *Frolic*. The *Wasp* was captured by the British ship *Poictiers*, and taken to Bermuda. Jones was soon paroled, and made post captain, 1813.

Jones, John Paul, 1747-92; American naval officer; b. Arbigland, Scotland; named John Paul Jones assumed in after life. After several merchant voyages he entered the American Revolutionary service as a lieutenant in the navy, 1775. As commander of the sloop *Providence*, of twelve guns and seventy men, he made a cruise of six weeks between the Bermudas and the gut of Canso. He was appointed captain, 1776, receiving command of the *Alfred*, and, 1777, of the *Ranger*. He made many prizes and broke up the fishery at Cape Breton. In November, 1777, he sailed to Europe, harassed the coasting trade of Scotland, and made a bold attack on Whitehaven. In 1778 he captured the *Drake*, a sloop of war, which with 200 prisoners he took into Brest (May 8th).

In February, 1779, Jones was appointed to the command of the ship *Duras*, an old Indiaman converted into a ship of war, whose name he changed to *Bon Homme Richard*. She carried forty-two guns. On August 14th he sailed from Lorient, having under his command a squadron of five vessels. By the middle of September, twenty-six vessels had been captured or destroyed by them, which created great alarm on the E. coast of England. On September 23d the *Bon Homme Richard* was off Flamborough Head, having in company the *Alliance* and the *Pallas*, a ship mounting thirty-two light guns. The English fleet soon appeared, and an engagement ensued. The *Richard* closed with the *Serapis*, commanded by Capt. Pearson, and after a terrible contest of nearly three hours that vessel was surrendered. The *Richard* was almost destroyed in the contest, and subsequently sank. The *Serapis* suffered much less. She was a new ship, and much superior in force to the *Richard*, mounting fifty guns. Her crew numbered 320, while those engaged on the *Richard* were only 227. Jones carried his prize into the Texel. On his arrival in France he was received with the most distinguished honors.

In 1781 he sailed for the U. S., where Congress voted him a gold medal. He was afterwards employed to superintend the construction of a line-of-battle ship, the *America*, at Portsmouth, N. H. He then went to Paris as an agent for prize money, and while there was invited into the Russian service with the rank of rear admiral. He quarreled with the admiral, the Prince of Nassau; soon retired from the service, and settled in Paris, where he died in poverty and neglect. After a long search Gen. Horace Porter, U. S. ambassador to France, found the remains of Jones, in a remarkably good state of preservation, 1905. They were brought to the U. S. by a special naval squadron, and entombed on the grounds of the Naval Academy the same year.

Jones, Sir William, 1746-94; English jurist and Orientalist; b. London; appointed a judge of the Supreme Court of Judicature at Fort William, Bengal, 1783. While in India he planned and partly carried out a digest of Hindu and Mohammedan laws (finished by Colebrooke after Jones's death). He had an acquaintance with over twenty ancient and modern languages. By his "Poeseos Asiaticæ Commentariorum Libri Sex," and his translations from the Sanskrit, he opened the literary treasures of the East to the English-speaking public, and founded the Asiatic Society, 1784.

Jongkind (yōng'kint), **Johan Barthold,** 1819-91; Dutch painter; b. Latrope, Holland; best known of his pictures are "Port du Mer," "Vue du Port d'Harfleur," "Souvenir du Havre," "La Meuse à Dordrecht," "Intérieur du Port à Dordrecht," "Entrée du Port à Dordrecht," etc.; also etched some admirable plates of landscape subjects.

Jongleur (zhōṅ-glėr'), French wandering poet, or singer, of the Middle Ages; originally merely one of the popular performers of whom we hear much during the last centuries of the Roman Empire, and who bear many different names—*mimi, scurræ, histriones, thymelici, saltatores*, etc. These actors, clowns, buffoons, having at first distinct functions, seem to have been merged soon after the fall of the empire into one class of vagrant mountebanks, who amused the populace with music, songs, or tricks, indifferently. The Christian writers of the early Church held them in horror, and successive councils in the Middle Ages singled them out for special denunciation. At all times the jongleurs were professional singers, practicing their art as a livelihood; and this gives us the line of distinction between them and the Troubadours and Trouvères. Both these latter—the ones in Provence, the others in N. France—were primarily composers, or poets; and in Provence the chief function of the jongleurs was to bring out the poems of the troubadours.

Jönköping (yön'kö-pīng), town of Sweden, named in history as early as the thirteenth century; at the S. extremity of Lake Wetter, and surrounded by pine-clad hills; has large ironworks and paper mills, but its greatest industry is the manufacture of safety matches, much used in France, Great Britain, the U. S., etc. The completion, 1832, of the Göta Canal, connecting the North Sea with the Baltic (Göteborg with Stockholm), made Jönköping a seaport, and thus greatly increased its commercial facilities. Pop. (1907) 24,174.

Jon'quil, name given to *Narcissus jonquilla* and *odorus* (family *Amaryllidaceæ*), garden plants blooming in spring; natives of the S. of Europe; the flowers of the fragrant kinds employed in perfumery.

Jon'son, Benjamin, commonly called BEN, abt. 1573–1637; English dramatist; b. Westminster; posthumous son of a clergyman; worked for a time as a bricklayer, then served a campaign in Flanders; abt. 1593 went on the stage, but met with little success as an actor. In 1596 appeared his "Comedy of Humors," which was recast and brought out at the Globe Theater, 1598, under the title of "Every Man in his Humor," with Shakespeare as one of the performers. He subsequently produced "Every Man out of his Humor," "Cynthia's Revels," the "Poetaster," and "Sejanus," a tragedy. Shortly after the accession of James I he was imprisoned with Chapman and Marston for writing, in conjunction with them, "Eastward Ho," containing some reflections on the Scottish nation. They were soon pardoned, and James employed Jonson in writing masques and other court entertainments. Between 1605 and 1611 appeared his comedies of "Volpone," "Epicœne, or the Silent Woman," and "The Alchemist," and the tragedy of "Catiline." In 1619 he received the appointment of poet laureate with a pension of 100 marks. Charles I aided him, but his improvident habits kept him always in difficulties. He wrote two or three more dramas, which Dryden calls his "dotages," and left "The Sad Shepherd," a fragment of great beauty. He published, 1616, a folio edition of most of his works produced previous to that date, carefully revised and corrected. He was buried in Westminster Abbey.

Jop'lin, city in Jasper Co., Mo.; 168 m. S. of Kansas City; is in an agricultural region; is the center of the SW. Missouri lead and zinc district; contains smelting furnaces, white-lead works, paint works, machine shops, foundries, boiler works, and flour mills. Pop. (1906) 35,671.

Jop'pa. See JAFFA.

Jo'ram, or **Jeho'ram,** name of two Hebrew kings, one of Israel, the other of Judah. JORAM, King of Israel, was the second son of Ahab, and succeeded his brother Ahaziah. He reigned from 851–842 B.C.; revived the worship of Jehovah and repressed the worship of Baal. JORAM, King of Judah, was the son and successor of Jehosophat; reigned from 848–844. During his reign the country was disturbed by the revolt of the Edomites and the sack of Jerusalem by Bedouin tribes.

Jordaens (yōr'däns), **Jakob, or James,** 1594–1678; Dutch painter; b. Antwerp; painted for the King of Sweden twelve pictures representing the passion of Christ; other works are the picture of St. Bavone in the Cathedral of Ghent, often attributed to Rubens, and "Christ Disputing in the Temple," at Saint-Valburga, Furnes, one of his finest works.

Jor'dan, Dorothea, 1762–1816; actress; b. near Waterford; made her début at Drury Lane, London, 1785. In 1790 her connection began with the Duke of Clarence, afterwards William IV. This relation was only broken off, without satisfactory explanation, 1811, and she retired to the Continent, 1814. King William raised her eldest son to the peerage, as Earl of Munster, 1831, and gave the other Fitz-Clarences the rank of younger sons and daughters of a marquis.

Jordan (yōr'dän), **Wilhelm,** 1819–1903; German poet; b. Insterburg, Prussia; was a member of the National Assembly, 1848; most famous poem, "Demiurgos"; other works include a history of Haiti, tragedies and comedies, translations of Sophocles and Shakespeare, and "Sigfridsage," an epic, in a peculiar old German metre, portions of which he recited in Germany and the United States.

Jor'dan (Heb. HA-YARDEN, "the descender"), now called by the Arabians of Palestine ESH-SHERIAH, or SHERIAT EL-KEBIR, "the great watering place," only large river in Palestine. Its sources are on the S. declivities of the Libanus and Anti-Libanus, the highest on Mt. Hermon, near the village of Hasbeiya. Under the name of the Hasbany, it flows W. and then S., receiving small tributaries till it enters the marshy plain of Huleh, where it is joined by the united stream of the Leddan, Dan, or Daphne, and the Banias, the two larger and principal sources of the Jordan, the first of which rises 12 m. below the source of the Hasbany, and the other 4 m. farther E., near Banias. After passing through Lake Merom the

river is sluggish and turbid, but is soon purified, and becomes a torrent, and after passing through the lake of Tiberias or Gennesaret, it enters a broad valley or *ghor*, through which its course is so tortuous that within a space only 60 m. long and 4 or 5 m. broad it traverses at least 200 m. and plunges over twenty-seven formidable rapids. It enters the Dead Sea at its N. extremity, after a total direct course of 120 m. Its mouth is 180 yds. wide. Its principal affluents are the Zurka (Jabbok) and Sheriat el Mandhur, or Yarmuk. Its entire descent from Hasbeiya to its mouth is about 3,000 ft., from Banias about 2,450 ft. At the surface of the Lake of Tiberias it is 653 ft. below the Mediterranean, and at the Dead Sea 1,316 ft.

Jordan, river of Utah, flowing N. from Utah Lake to Great Salt Lake; length about 40 m.; its water extensively used for irrigation, and in dry seasons is entirely diverted by irrigating canals.

Jornan'des (or, according to the oldest manuscripts, JORDANES), Gothic historian, who lived about the middle of the sixth century; was at first one of the secretaries of the King of the Alans, who inhabited Mœsia, but was converted to Christianity, and became a monk; wrote "De Getarum sive Gothorum Origine et Rebus Gestis," chiefly an extract from Cassiodorus's lost "History of the Goths," with which has been generally printed his "De Regnorum et Temporum Successione," a synopsis of universal history.

Jorullo (chō-rōl'yō), volcano of Mexico, in State of Michoacan. From a plain having an elevation of 2,890 ft. it was suddenly lifted to a height of 4,265 ft. on September 28, 1759. Several of its cones soon subsided, however, and it is now nearly extinct, discharging only a little vapor, and is nearly covered with forests.

Jo'seph, son of Jacob and Rachel; was envied by his brethren on account of his father's partiality for him; sold by them for a slave to a caravan of Arabian merchants, and was taken to Egypt, where he rose to the highest power. While the famine prevailed, his brethren came to Egypt to buy corn. He made himself known to them, and appropriated to Jacob and his family the land of Goshen. Taking advantage of the necessities of the people during the famine, he "bought all the land of Egypt for Pharaoh." He died at the age of one hundred and ten years. His two sons, Manasseh and Ephraim, became heads of tribes.

Joseph, spouse of Mary, the mother of Jesus Christ. He was of the tribe of Judah, and a descendant of David. Matthew and Luke give his genealogy. It is not known where he was born. He is supposed to have died before the crucifixion of Christ, but there is little mention of him in the Scriptures. In the Roman Catholic Church, March 19th is his festival.

Joseph, King of Naples and of Spain. See BONAPARTE, JOSEPH.

Joseph I, 1678–1711; German emperor; b. Vienna; was crowned King of Hungary, 1689; King of the Romans, 1690; succeeded his father, Leopold I, 1705. The great events of his reign were the putting of the Electors of Cologne and Bavaria under the ban (1706) and the seizure of their states; the conquest of Naples under Daun; the successful revival (1707–8) of the imperial claims to the great fiefs of Italy; and the victories of Marlborough and Eugene in the war of the Spanish succession.

Joseph II, 1741–90; German emperor; b. Vienna; son of Francis I and Maria Theresa; succeeded his father, 1765; took part in the first partition of Poland, 1772; succeeded his mother in Hungary and Bohemia, 1780; attempted the wholesale reformation of all the empire and his kingdom by edicts abolishing serfdom, declaring for religious liberty, the reform of jurisprudence, the abolition of monasteries, etc.; but as the means employed were violent and unusual, and the changes but ill adapted to the state and feelings of the people, nearly all classes, led by nobles and priests, joined in the opposition, and the emperor was compelled to yield (1790) and withdraw his novel measures. The scheme most strongly resented by his subjects was his attempt at fusing the different nationalities over which he ruled into one homogeneous mass (German).

Jo'sephine (full name MARIE JOSEPH ROSE DE TASCHER DE LA PAGERIE), 1763–1814; Empress of the French and first wife of Napoleon I; b. Martinique, W. Indies; was married, 1779, in France, to the Vicomte de Beauharnais; became the mother of Eugène Beauharnais and of Hortense, the mother of Napoleon III. Her husband was executed by the Jacobins, 1794, and Josephine's life was saved with some difficulty by Madame Tallien, who rescued her from prison, 1794. In 1796 she married Gen. Napoleon Bonaparte, then a rising officer, afterwards appointed to the chief command in Italy. The match was prompted by mutual love, and was long a union of great happiness to both. In 1804 she was crowned empress, and both before and after that event Josephine's wisdom and talents, and the affection with which she was popularly regarded, did much to strengthen Napoleon's position in France; but the fact that the union was childless was likely to be fatal to Napoleon's ambition to become the founder of an imperial line; and, 1809, she was divorced, and retired to Malmaison, where she died.

Jose'phus, Flavius, abt. 37–100 A.D.; Jewish historian; b. Jerusalem. His father belonged to the highest sacerdotal family, and his mother was descended from the Asmonean princes. He received a superior education. At the age of twenty-six he was sent to Rome to plead the cause of some Jewish priests arrested by the Procurator Felix, and not only effected the liberation of his friends, but received many presents from the Empress Poppæa, wife of Nero. He opposed the Jewish revolt, but finally joined the war party, and was appointed one of the generals and deputed to defend the province of Galilee. On the approach of Vespasian, 67, he threw himself into Jotapata, and

maintained a desperate resistance for forty-seven days. Escaping from the massacre which succeeded its fall, he was betrayed to the Romans, when he assumed the character of a prophet, and announced to Vespasian that the Roman Empire would one day be his and his son's. After the siege of Jerusalem he accompanied Titus to Rome, where he passed the remainder of his life in literary pursuits. His principal works are a "History of the Jewish War," written in Hebrew, translated by himself into Greek, and published abt. 75; and a treatise on "Jewish Antiquities," written in Greek, completed abt. 93.

Joseph, Father (François Leclerc du Tremblay), 1577–1638; French propagandist; b. Paris. His mother belonged to the Lafayette family. He served in the army under an assumed name. Entering the priesthood, he became an eminent Capuchin friar, and Cardinal Richelieu employed him as his secretary. He promoted foreign missions, advocated a crusade against the Turks, and evinced a wonderful capacity for political affairs. His most remarkable writings are his manuscript memoirs in the National Library. Gérôme painted a celebrated picture of him entitled "L'Éminence grise."

Josh'ua, Hebrew general and successor of Moses; son of Nun, of the tribe of Ephraim; was appointed by Moses, at the age of eighty-five, to the command of the Israelites, led them into the Promised Land, and divided the country among the tribes. He governed Israel twenty-five years. His history is contained in the canonical book called after him.

Josi'ah, d. abt. 609 B.C.; King of Judah; son of King Amon; succeeded to the throne abt. 640 B.C., at the age of eight, becoming the sixteenth king of Judah after its separation from the Kingdom of Israel. In the eighteenth year of his reign he repaired and adorned the neglected temple of the Lord, and, incited by the reading of the newly discovered book of the law, destroyed all vestiges of idolatry. He fell in the battle of Megiddo against Necho, King of Egypt.

Josika (yō'shē-kōh), **Miklos** (Baron), 1796–1865; Hungarian novelist; b. Torda, Transylvania. On the reunion of Transylvania with Hungary, 1848, he became a member of the Upper House of the Hungarian Diet, and of the committee of defense under Kossuth. After the Revolution he lived in Brussels and Dresden. His historical novels include "The Last of the Báthoris," "The Bohemians in Hungary," "Zrinyi the Poet," "Stephen Jósika," and "Francis Rákóczy II."

Josquin Despres (zhōs-kăń' dā-prā'), or **Jodo'cus Praten'sis,** 1450–1531; French composer; b. probably at St. Quentin, Aisne; was chapel master at the papal court of Sixtus IV at Rome, 1471–84, and afterwards under Louis XII at Paris; was a prolific writer of masses, motets, and songs, and is generally considered the greatest composer before Palestrina.

Jos'selyn, John, English traveler; b. Kent; visited New England, 1638, 1663, and published "New England's Rarities Discovered," "An Account of Two Voyages to New England," "Chronological Table of the Most Remarkable Passages from the First Discovery of the Continent of America to 1673."

Jötun (yö'tŭn), giant of Scandinavian and Germanic myths. These giants are probably related to the worship of the dead (ancestor-worship), but appear in myth as a race of actual giants living in Jötunheim, a remote mountainous region in the realm of darkness and cold. A ray of light will turn them to stone. They are huge, sometimes many-headed and many-handed, of dull, ironlike color, ugly, enormously strong, stupid. They are mainly hostile to men, and opposed to the helpful gods; now and then they are kind, and bring good luck. They are classified as of the air, mountains, forest, or water; later, as of night or of the underworld.

Joubert (zhō-bār'), **Barthélemy Catherine,** 1769–99; French general; b. Pont-de-Vaux, Ain; signalized himself by his Republican convictions, and was considered as the only man able to counteract Bonaparte's ambition, and to become the chief of a definitely established republic of France; enlisted, 1791, as a volunteer; was promoted on the battlefield, 1795, to the rank of general; contributed largely to the success of Bonaparte in the battles of Montenotte, Mondori, and Rivoli; was killed at the battle of Novi, where his army was defeated by Souvarow.

Joubert, Petrus Jacobus, 1834–1900; Boer soldier; b. Cango, Cape Colony; elected to the Volksraad, 1863; Attorney-General of the Transvaal; and acting President, 1874; bitterly opposed British annexation, and was made commander in chief in first Boer war (1880–81), commanding at Laings Nek, Ingogo, and Majuba; organized and equipped the Boer army, and again led it into the field in 1899.

Jouffroy d'Arbans (zhō-frwä' dăr-bäń'), **Claude François** (Marquis de), abt. 1751–1832; French mechanician; b. Franche-Comté. The idea of steamboats occurred to him first, 1775, on occasion of his examining a fire engine; but, discouraged by unsatisfactory experiments and by the Academy and the Government, he went to England, and did not return to France till the Consulate. In 1816 he published "Les bateaux a vapeur," and received permission to form a company. The first steamer was launched on the Seine, August 20th, but the enterprise ended disastrously. His claim to the discovery of steam navigation was acknowledged by Arago and the Academy; and his friend Fulton spoke highly of his invention.

Jougs (jōgz), **Joggs, or Juggs,** instrument of punishment used in Scotland, the Netherlands, and perhaps other European countries up to about the nineteenth century. It was simply an iron collar placed around the culprit's neck and fastened by a padlock. A short chain ran from the collar to a staple in a tree, wall, or building—often the parish church. The punishment was substantially that of the pillory.

Joule (jōl), **James Prescott**, 1818–89; English physicist; b. Salford; early made investigations relating to electro-magnetism, the thermal effects of fluids in motion, the volumes occupied by bodies when in a solid state and when dissolved in water, etc.; but devoted himself chiefly to the subject of heat in its relation to mechanical power. About 1840 he communicated to the Royal Society the discovery of a principle in the development of heat by voltaic action, in which he established certain relations between heat and chemical affinity. By numerous trials he found that the quantity of heat required to raise one pound of water one degree F. in temperature is precisely competent to raise 772 lbs. avoirdupois one foot in height; or, in other words, is equal to 772 "foot pounds," which is the measure of the force called the mechanical equivalent of heat. In consideration of these important labors, the Rumford Medal of the Royal Society was awarded to him, 1852, and, 1870, he received the Copley Medal. His contributions to scientific periodicals and other publications were numerous and important.

Joule, The, practical unit of work chiefly employed by writers on electricity. The absolute unit of the C. G. S. system is altogether too small to be convenient in computations involving the expenditure of appreciable amounts of energy. There has come into use in consequence a practical unit which is equivalent to 10,000,000 absolute units. This practical unit was officially adopted by the International Congress of Electricians which met at Chicago during the World's Columbian Exposition, 1893. In honor of James Prescott Joule, they recommended "as a unit of work the joule, which is equal to 10^7 units of work in the C. G. S. system, and which is represented sufficiently well for practical use by the energy expended in one second by an international ampère in an international ohm."

Jourdan (zhôr-dăn'), **Jean Baptiste (Count)**, 1762–1833; French general; served five years in America under Count d'Estaing, and was discharged 1784; then became a merchant's clerk, and had married a milliner at Limoges and adopted her business when the Revolution broke out. He became a lieutenant of the National Guards, distinguished himself in Belgium under Dumouriez, and became general of division, 1793, and commander of the army of the Sambre and Meuse, 1794. His victory at Fleurus, June 26th, and other successes drove the Austrians beyond the Rhine. In 1795 he displayed uncommon talents in crossing that river. In 1796 he defeated Clerfayt at Altenkirchen, but, being worsted near Würzburg by the Archduke Charles, he was obliged to fall back, and resigned. In 1797 he was elected to the Council of Five Hundred, where he procured the adoption of the law of military conscription. He was president of that body in October, 1798, when he assumed the command of the army on the Danube. After a short and unsuccessful campaign, he returned to Paris, was reëlected to the Council of Five Hundred, objected to Bonaparte's proposed usurpation, and was excluded from the Corps Législatif formed after the 18th Brumaire. He nevertheless was sent on a special mission to Piedmont; reconciled that country to the French domination; became marshal, and, 1806, Governor of Naples. He was in the service of King Joseph in Spain, 1808–13, and was treated by Napoleon with a coldness amounting to disgrace. In 1814, having assented to his deposition, he received a peerage from Louis XVIII. He joined Napoleon during the 100 days, but on his defeat at Waterloo rejoined the Bourbons, who made him count and peer. On the Revolution of July, 1830, he was for a few days Minister of Foreign Affairs, and was appointed governor of the Invalides.

Jour'nal. See GUDGEON.

Jour'nalism. See NEWSPAPERS.

Joust (jūst), in the knightly exercises of the Middle Ages a contest with arms, especially between two single combatants. The joust was either on foot or horse; the poleax and sword, but more commonly the lance, was the weapon used. The joust, as a rule, was a friendly contest, and was regulated by punctilious rules. When more than two engaged in such a contest, it was properly a *tourney*.

Joutel (zhō-tĕl'), **Henri**, b. abt. 1651; French explorer; b. Rouen; was commander under La Salle of his first fort in Texas, and also of the larger one, St. Louis, when the latter set out in November, 1685, in search of the Mississippi. Joutel accompanied him in his last expedition, in January, 1687; was in charge of the camp when La Salle was assassinated; reached Canada by way of the Illinois; was implicated in frauds in the Illinois country, and arrived in France, 1688. His "journal" of the expedition was published, 1713.

Jouvenet (zhōv-nā'), **Jean**, 1647–1717; French historical painter; b. Rouen; settled in Paris; became professor and president of the Academy of Painting; most noted works, many in the Louvre Gallery, "Esther Before Ahasuerus," "The Miraculous Draught of Fishes," "Resurrection of Lazarus," "Jesus Driving the Money Changers from the Temple," and the "Descent from the Cross."

Jove. See JUPITER.

Jovianus (jō-vi-ā'nŭs), **Flavius Claudius**, d. 364; Roman emperor; son of Varronianus, the distinguished general; was captain of the life guards of the Emperor Julian in the Persian campaign, in which the latter was killed (June 26, 363 A.D.), and was proclaimed as his successor the following day by the choice of the generals. In the midst of an embarrassed and hazardous retreat from the Persian territory beyond the Tigris terms of peace were proffered by the Persian king, Sapor II, which, though humiliating, were gladly accepted by the new emperor. During his slow retreat toward Constantinople, Jovianus promulgated edicts reëstablishing Christianity as the dominant religion, but protecting the pagans. On the journey he was found dead in his bed at Dadastana, a village in Galatia. His successor was Valentinianus I.

Jow'ett, Benjamin, 1817–93; English educator and author; b. Camberwell; became Regius Prof. of Greek at Oxford, 1855; Master of Balliol College, 1870, and vice chancellor of the Univ. of Edinburgh, 1882; most noted of many works, "The Dialogues of Plato, Translated into English, with Analyses and Introductions."

Jowf, oasis of marvelous fertility in Arabia; a deep, well-watered depression in the desert, almost 70 m. long and 12 m. wide; climate uniform and temperate. The gardens are famous for their vegetables and fruit, the dates, figs, grapes, and melons being, the Arabs say, unequaled elsewhere. The inhabitants, comprising 34,000 in the chief towns, Jowf and Sekakah, and 6,000 in seven or eight villages, are Arabs of the finest physical type, and are celebrated for their generosity and courage.

Juan Fernandez (hō-ăn' fẽr-năn'dĕth), group of islands belonging to Chile; in the Pacific Ocean; consists of three islands: Mas-ā-tierra, or Juan Fernandez proper, 351 m. from the Chilean coast, and 12½ m. long by 5½ m. in greatest width; Mas-ā-fuera, 100 m. farther W., and 10 m. long by 2¼ wide, and the islet of Santa Clara, 1 m. SW. of Mas-ā-tierra; total area, 72 sq. m. All are high and rugged. The peak called El Yunque, on Mas-ā-tierra, is 3,225 ft. high, and one of the peaks of Mas-ā-fuera reaches 6,070 ft. They are of volcanic origin, but apparently have no active craters, though there are reports of flame and smoke seen over the mountains. The group was discovered by a Spanish pilot, Juan Fernandez, probably about 1583. It became the resort of buccaneers, and later of whalers. Alexander Selkirk lived in solitude on Mas-ā-tierra, 1704–9, and his story is said to have suggested De Foe's "Robinson Crusoe." Later this island was a penal settlement of the Spanish colonies, and during the war for independence, 1810–17, many political prisoners were kept on it. Since 1877 all the islands have been farmed out to private speculators.

Juarez (hō-ä'rĕs), **Benito Pablo,** 1806–72; Mexican politician; b. Guelato, Oajaca; was of a poor Indian family, but obtained an education and was admitted to the bar, 1834; after serving as deputy in the National Congress and as Governor of Oajaca, 1847–52, was banished by Santa Anna, but returning, 1855, assisted in the latter's overthrow; was successively Minister of Justice, President of the Supreme Court (and hence, by the new constitution, Vice President), and Minister of the Interior under Comonfort. He aided in the revolt against Comonfort, became President by succession, 1858, and, after a civil war, was chosen President, 1861. Civil war continued, and the suspension of payment on the national debts caused the interference of France, England, and Spain, ostensibly in favor of the bondholders. The French occupied Mexico, Maximilian was proclaimed Emperor, and the army of Juarez was reduced to scattered bands, but Maximilian, left to his own resources, lost ground, was defeated, captured, and shot, 1867. Juarez assumed the presidency *ad interim*; in August was reëlected, and, 1871, was again elected, but opposition and insurrections continued till the day of his death.

Juarez, name of several villages and towns in Mexico, all named, probably, in honor of Benito Pablo Juarez. The most important one is that formerly called Paso del Norte, across the Rio Grande from El Paso, Tex., and terminus of the Mexican Central Railway. It is in the customs "free zone," and has a considerable trade.

Ju'ba, d. 46 B.C.; King of Numidia; succeeded to the throne on the death of his father, Hiempsal, and in the conflict between Cæsar and Pompey sided with the latter, defeated Curio, Cæsar's lieutenant, and almost cut to pieces his army (49). He enjoyed his kingdom in peace till 46, when Cæsar defeated him and the Pompeian forces at Thapsus. Juba wandered for a few days as a fugitive, and then in despair killed himself. His infant son, Juba, was taken to Rome, and became a favorite of Octavius, who, 30 B.C., restored him to his father's kingdom. He wrote works which are lost.

Ju'bilee, among the ancient Hebrews in Palestine, the fiftieth year, the year succeeding every seventh sabbatical year. During this year all lands lay fallow, all Hebrew slaves were set at liberty, and all lands reverted to the heirs of the original owners, to whom the lands had been parceled out in Joshua's time. In the Roman Catholic Church, Boniface VIII (1300) established a jubilee to be held once a century; Clement VI (1343) ordered it to be held once in fifty years; Urban VI (1389) once in thirty-three years; Paul II (1470) fixed the interval at twenty-five years.

Ju'bilees, Book of, important pseudepigraphical book, originally written in Hebrew, probably in the first century; translated at an early date into Greek, was prized by the early Christian Church but both Hebrew and Greek texts were lost (except fragments of each) before the thirteenth century. In 1844 Dr. Krapf discovered in Abyssinia an Ethiopic version from the Greek. This book is regarded as canonical by the Abyssinian Church. It pretends to be a revelation made to Moses, and is named from the fact that it treats of biblical history in *jubilees*, or periods of fifty years. The unknown author's design was to furnish a commentary on Genesis and Exodus. The critical value of the work is that it shows the popular conceptions of the Judaism in which Christ labored.

Judæ'a, or Jude'a, name first used in ancient geography for the Kingdom of Judah, in contradistinction to the Kingdom of Israel; after the return from the captivity and up to the times of the Romans it denoted the whole of Palestine. The Romans used it partly in a general sense, signifying the land of the Jews; thus Herod was styled King of Judæa, though he ruled over countries not belonging to Palestine; partly in a restricted sense, denoting the southernmost division of Palestine, bounded N. by Samaria, E. by the Jordan and the

Dead Sea, S. by Idumæa, and W. by the Mediterranean. It was part of the province of Syria and ruled by a procurator.

Ju'dah (Heb. YEHUDAH), Jacob's fourth son by Leah. The tribe named after him, whose territory lay in the extreme S. of Palestine, between the Dead Sea and the Mediterranean, became powerful under the dynasty of David, and, after the division of the Hebrew state, with Benjamin formed the Kingdom of Judah. After the destruction of the northern kingdom, Judah became the common name of the Hebrew nation in general, and the name Jews (Heb. *Yehudim*, Lat. *Judæi*) is derived from it.

Judah, surnamed HAKKADOSH ("the Holy"), abt. 1080–1140; celebrated rabbi of the second century; of the house of Gamaliel, one of his successors as *nasi* (patriarch), and the principal author of the "Mishnah."

Judah, surnamed HALLEVI ("the Levite"), Spanish rabbi, called as an Arabic writer ABUL HASSAN; b. Castile; distinguished himself as a physician, philosophical theologian, and poet; principal work, "The Khazar," an exposition of Judaism, written in Arabic, and translated into Hebrew, Latin, Spanish, and German.

Ju'das Iscar'iot, one of the twelve apostles, and the betrayer of Christ; was the son of Simon; was appointed treasurer of the apostles; covenanted with the chief priests to deliver Jesus to them for thirty pieces of silver; accomplished his purpose; and in despair committed suicide.

Judas Tree, popular name of the *Cercis siliquastrum*, a small tree of the family *Leguminosæ*, having rose-colored flowers, round leaves, handsome wood; is used in joinery; is a native of Europe and Asia. There was anciently a

JUDAS TREE.

dispute as to whether Judas Iscariot hanged himself on this or on the elder tree. The Judas tree, or redbud of the U. S. (*C. canadensis*), resembles the Judas tree of Europe, but has pointed leaves and smaller flowers. Its abundant flowers, of a peach-blossom color, appear in spring and are very beautiful.

Jude, Saint, surnamed THADDEUS OF LEBBEUS, one of the apostles, a relative of Jesus (some say a brother). No circumstances of his life are related. He is commemorated in the Western Church, October 8th. The genuineness of the epistle attributed to him was very early disputed, chiefly because it cites the two apocryphal books of "Enoch" and the "Assumption of Moses." Most critics, however, have maintained it.

Jude'a. See JUDÆA.

Judge, a public officer who is invested with authority to hear and determine litigated causes. It is a maxim of the common law that "no one can be a judge in his own cause." Impartiality in the administration of justice requires necessarily that the judge should be an entirely disinterested party. This disqualification applies not only in regard to causes in which the judge is a party of record, but as well to causes in which he has some private or pecuniary interest. For instance, a judge who is a stockholder in a corporation cannot do any judicial act in a cause in which that corporation is a party.

In the trial of a cause it is the province of a judge to decide upon the admissibility of evidence. If his rulings are deemed erroneous, objection may be made to them by counsel, and exceptions taken, upon which a motion for a new trial or an appeal may subsequently be based. Credibility of the testimony is to be determined by the jury. The judge decides upon the competency of witnesses offered to be sworn. There are some forms of legal business which may be transacted only before a court acting as such, while others may take place out of court, and before an officer acting as a judge. A distinction is thus drawn between a court and a judge, the latter word being used to indicate that business before the officer is transacted out of court, and he is usually spoken of as "sitting in chambers." See JUDICIARY.

Jud'ges, The Book of, an historical book of the Old Testament. It derives its name from a class of rulers or chiefs who ruled in Israel during the period which its record covers. The twelve tribes after entering Canaan formed only a loose confederation, without unity or national feeling or dignity. They had no head. They were at the same time engaged in such wars as all conquerors must maintain with those whom they displace, and they were also harassed by foreign foes. In emergencies men (or women) of talent and energy took the lead, their only authority being their ability. They were regarded as "raised up" or divinely sent. The name given to them is the same which we meet with in the Phœnician, "suffetes." When one had gained authority by displaying ability in a crisis, he became a "judge" in the forensic use of the term. This period was not one to awaken the national pride out of which history is born, or to produce historical records. In some cases, as in that of Samson, the judge became a popular hero, and the subject of song and poetry. Certain records of this time are collected in the book of Judges. They are fragmentary and imperfect, as is abundantly shown

by the state of their chronology. In the Talmud this book, grouped with Ruth and the two books of Samuel, is said to have been written by Samuel. In a strict sense he cannot have been the author of them, but he may have been the author in the sense of being the leading spirit in the literary movement which produced them, doing parts of the literary work himself.

Judg'ment, the legal determination of an action. It may be either interlocutory or final. If something is reserved for future judicial decision, the judgment is interlocutory, as when it is decided that an accounting must be made by one party to the other, the court, later, approving the accounting and ordering the balance to be paid. But a judgment which directs the sale of certain property and the application of the proceeds to pay a judgment debt is final, as the subsequent sale and payment require no further decisions by the court. In an equity suit the final determination of the rights of the parties is called a decree, and may include many matters. A common-law judgment is brief and inelastic, as a direction that money be paid or property recovered. An "order" is a judicial decision of a motion settling a point of practice or some collateral question to the main issue. In litigated cases the attorney for the prevailing suitor usually drafts the formal judgment and submits it for the court's approval. Sometimes a judgment is entered *nunc pro tunc* (now for then)—*i.e.*, to take effect as of a day prior to its actual entry. When a judgment for any reason is voidable but not void, it is valid until vacated on an appeal, or by a motion or suit to set it aside.

Judgments for the payment of money ordinarily become a lien on the real estate of the debtor as soon as they are docketed in the proper office. The means by which this lien is acquired, the property upon which it attaches, and the period of its continuance are matters of statutory regulation which cannot be enumerated here. If a judgment is not satisfied, its life may be given a new lease by a suit upon the judgment, and the statute of limitations will begin to run again on the new judgment. Judgments are sometimes called "contracts of record," although they are not contracts in the sense that they represent an agreement between the parties.

Judiciary (jū-dīsh'ä-rĭ), the organ of government by which the law is declared and applied in litigated controversies. In primitive communities its functions are exercised by the king, and even in early English history the courts followed the person of the king till the consequent hardship on litigants was realized, and a statute ordained that causes should be heard at Westminster. Aristotle in his "Politics" recognized that "every polity comprises three departments"—"the deliberative body," or legislative; "the officers of state," or executive, and "the courts of law," or judiciary, but such separation in many countries is not even yet distinct. In England, for instance, the "law lords" of the House of Lords—a part of the legislature—form the tribunal of last resort. A complete separation of the judiciary is one of the wisest provisions of the U. S. Constitution.

Since the British Parliament has unrestricted power of legislation, its acts are binding on the courts. In the U. S., however, the judges possess the power to declare an act of the legislature unconstitutional, and the same rule holds in the self-governing colonies of Great Britain. As it is the essence of judicial duty to declare the law and not to do justice irrespective of law, courts will not adjudge a statute unconstitutional because it is unjust, nor because it violates the spirit of the state's institutions, nor because it impairs any of those rights which it is the object of a free government to protect, provided it does not conflict with some provision of the Constitution.

To secure the highest usefulness for the judiciary, it must be freed from the possibility of domination by the other branches of government. This freedom is secured by providing fixed salaries for the judges, and a tenure of office during good behavior. The fearlessness and independence of the judiciary is further promoted by limiting their legal responsibility, as the impartial adminstration of justice requires that those who dispense it should not be exposed to any influences which would make them timid and overcautious. The remedy against a judge who is guilty of criminal disregard or violation of duty is impeachment.

The Federal judges of the U. S. are appointed by the President, "by and with the advice and consent of the Senate," and hold office during good behavior. A few of the states observe the same practice, but most of them have an elective judiciary, the term of office varying from two to twenty-one years. This change in the method of selecting judges has caused much controversy. While it has not produced the evils predicted by its opponents, there is at present a tendency either to abandon it or to lengthen the terms for which the judges are elected. Generous salaries should be provided so that the best legal talent may be attracted to the bench.

Ju'dith, heroine of one of the apocryphal books of the Old Testament; is represented as inhabiting Bethulia, a town of Samaria, when it was besieged by an Assyrian army under Holofernes, chief general of King Nebuchadnezzar. With her maid she gained entrance into the camp, and, beguiling Holofernes by her beauty and artful speech, offered to show him a way into the city. He invited her to a banquet, at which he drank himself into a stupor, and when alone with him Judith cut off his head, which she bore away in a bag. The Bethulians next day attacked and routed the besiegers, who were discouraged at the loss of their leader.

Jud'son, Adoniram, 1788–1850; American missionary; b. Malden, Mass.; studied for the Congregational ministry; was ordained as a missionary to Burma, 1812, being a member of the first band ever sent from the U. S.; changed his views on the subject of baptism during the voyage, and on reaching Calcutta identified himself with the Baptist denomination. Judson labored for nearly forty years,

and before his death was surrounded by thousands of native converts. He translated the Bible into Burmese, and at his death had nearly completed a dictionary of that language. He had three wives: Ann Hasseltine, Sarah Hall (Boardman), who translated into Burmese the first part of "Pilgrim's Progress," and into Siamese the Gospel of Matthew and the Burmese catechism; and Emily Chubbuck, who before her marriage published several Sunday-school books, and under the pen name of "Fanny Forrester" a volume of stories and poems, entitled "Alderbrook," and, later, "The Kathayan Slave," "An Olio of Domestic Verses," etc.

Juengling (ying'ling), **Frederick, 1846–89**; American wood engraver, etcher, and painter; b. New York City; reached high rank as an engraver; was one of the founders of the American Society of Wood Engravers; engraved "The Professor," after Frank Duveneck, and "The Voice of the Sea," after Arthur Quartley; paintings include "The Intruder," "Westward Bound," and "In the Street."

Jug'gernaut. See PURI.

Jug'gler, one who practices or exhibits tricks by sleight of hand, or who makes sport by tricks of dexterity. The commonest tricks performed by these means have been known from the earliest times. When the troubadour degenerated to a vagabond, he became a *jongleur* (Latin *joculator*), whence the word juggler. Down to the nineteenth century ventriloquism was regarded as a physiological mystery, and of old it seemed awful when the river Nessus saluted Pythagoras, when a tree spoke before Apollonius, and when a new-born infant, or animals, or statues talked. Ancient jugglers performed extraordinary feats by mechanism. In those days the floors of temples heaved like waves, doors widened of themselves to admit portly visitors, tripods advanced to salute them, statues wept, nodded, and bled; all which marvels are imitated by modern jugglers.

In the seventeenth century by acoustics, invisible sprites called *trararmes* rapped audibly on any object indicated. The magic lantern explains the images of the gods shown in the water by ancient wizards, and the devils seen by Benvenuto Cellini in the Colosseum. The bottle yielding all kinds of wine, which has often appeared in romance, as on the table of Faust, has been realized by many wizards of the present day. Many tricks performed by modern Eastern jugglers have never been fairly explained, such as placing a boy in a basket on the ground and stabbing through it, causing blood to flow and the boy to vanish and reappear, and making trees grow visibly in a few minutes. In Egypt a naked juggler is tied up in an empty bag, and comes out bringing with him plates of food and lighted candles. The Indian and Japanese jugglers are also exceedingly skillful. Most eminent of modern jugglers was Houdin, who applied to his art both genius and science.

Jugur'tha, d. 104 B.C.; King of Numidia; illegitimate grandson of Masinissa; by bribery secured (117) the larger and better part of the Kingdom of Numidia, having previously murdered Hiempsal, the rightful heir to the throne; in 112 usurped E. Numidia after routing in battle and putting to death Adherbal, younger brother of Hiempsal. Some Italian merchants dwelling in Cirta, a city captured by him, having been slain, Rome declared war against Jugurtha, but he bought off the Roman commander and a peace was arranged. Investigation of the circumstances led to a renewal of the war, Metellus and Marius commanding the Roman army. Hostilities ended 106, Marius having gained possession of Jugurtha by treachery. The latter was led as a captive in the triumph of Marius, 104, and perished soon after in prison.

Ju-jit'su, or **Jiu-jit'su**, "the gentle art," a complicated system of self-defense formerly practiced exclusively by the Samurai class in Japan, but now used as a means of training by other classes in that country and, to some extent, elsewhere. The object of ju-jitsu is to overcome the brute strength by a skillful application of means calculated to render an opponent powerless, by making his own weight and movements tend to his downfall. Ju-jitsu aims more to develop quickness and self-possession than to teach a few more or less complicated wrestling tricks. The pupil is taught to fall easily so that he will not hurt himself, as by falling on a joint. Blows are delivered with the side of the hand on parts of the body where they will have a paralyzing effect, and a fallen opponent is so managed as to be rendered absolutely helpless.

Ju'jube, fruit of *Zizyphus vulgaris*, family *Rhamnaceæ*, a small tree of S. Europe and Africa. The fruit was formerly used for making "jujube paste," a confection, which is now

JUJUBE.

made of gum arabic, sugar, water, and egg albumen, without jujubes. Jujube sirup and dried jujubes have useful pectoral qualities, and make an agreeable drink for the sick.

Jujuy (hô-hwê'), or **San Salvador' de Jujuy**, capital of the province of Jujuy, Argentina;

on the Rio Grande, 1,077 m. N. of Buenos Aires; was founded 1592; has a national college and a customhouse. Pop. abt. 42,000.

Jukes, Joseph Beete, 1811–69; English naturalist; b. near Birmingham. In 1839 he was appointed geological surveyor of Newfoundland, and, 1842–46, was naturalist on H. M. S. *Fly*, in the survey of the great barrier reef along the E. coast of Australia. Having joined, 1846, the geological survey of Great Britain, he wrote for it important memoirs. In 1850 he became director of the geological survey of Ireland, and was for many years Prof. of Geology to the Royal Dublin Society and the Royal College of Science at Dublin. His investigations on coral reefs, the distribution of mollusca, and the formation of river beds were important contributions to science.

Ju'lia, 39–14 B.C.; daughter and only child of the Roman Emperor Augustus by his second wife, Scribonia; was married to Marcellus, 25 B.C.; after his death to Agrippa, 22 B.C.; and after his death to Tiberius, 12 B.C. Her dissipation and profligacy assumed such a character that her marriage was dissolved, and she was banished, first to Pandataria, an island near Naples, and then to Rhegium, where she died in want. Her daughter Agrippina became the wife of Germanicus.

Jul'ian the Apos'tate (FLAVIUS CLAUDIUS JULIANUS), 331–63; Roman emperor; b. Constantinople; son of Julius Constantius; was imprisoned in infancy by Constantius II, but was trained in the Christian faith and in philosophy (at Athens, where he was allowed to reside, 355). In 355 he was proclaimed Cæsar, married Helena, daughter of Constantine the Great, and sent to govern Gaul, where he ruled ably. He defeated the Alamanni near Strassburg, 357; was proclaimed Augustus at Paris by his troops, 360; marched against Constantinople, Constantius having interfered unduly in the affairs of Gaul; was proclaimed emperor on the death of Constantius, 361, and soon after avowed himself a pagan, though he tolerated all the sects. He set out on an expedition against Persia, 363, and in June was mortally wounded in battle. Author of a satire, "The Cæsars," and one on the people of Antioch, "Misopogon," "Against the Christians," and other works.

Julien (zhü-lē-äṅ'), **Stanislas Aignan,** 1799–1873; French syriologist; b. Orleans. Gail, Prof. of Greek in the Collége de France, appointed him his substitute, 1821, and, 1832, he became Prof. of Chinese. He translated Chinese tales, poems, dramas, and other books, published "Voyages des pèlerins Boudhistes" and a new Chinese grammar, and at the time of his death was preparing a complete Chinese dictionary.

Jul'ius I, Saint, d. 352; Bishop of Rome; was consecrated 337, and took part with Athanasius in his struggle for the Alexandrian bishopric.

Julius II (GIULIANO DELLA ROVERE), 1443–1513; pope; b. Albeznola; nephew of Sixtus IV; was made Bishop of Carpentras and a cardinal, 1471, and held no less than eight bishoprics, besides the archbishopric of Avignon; was papal legate to France; after the death of Pius III, carried the papal election, 1503, aided by Cæsar Borgia. His two great diplomatic feats were the formation of the League of Cambray, 1508, and the Holy League, 1512.

Julius III (GIOVANNI MARIA DEL MONTE), 1487–1555; pope; b. Arezzo; became a cardinal 1536; was papal legate to the Council of Trent, 1545; chosen pope, 1550; was thenceforth chiefly remarkable for luxurious habits.

Jullundur (jŭl'lŭn-dĕr), or **Jalandhar** (jŭl'lăn-dhăr), capital of the province and district of the same name in the Punjab, British India; 80 m. ESE. of Lahore. Pop. (1901) 67,735.

July' (Lat. *Julius*), seventh month of the year, consisting of thirty-one days. By the Romans it was originally called Quintilis (quintus, fifth), it being the fifth month in the original Latin year, which before Numa began with March. The name was changed to July, by proposal of Mark Antony, in honor of Julius Cæsar, who was born on the 12th of this month.

Jumna (jŭm'nä). See JAMNA.

Jump'ing Hare. See JERBOA.

June, sixth month of the year, consisting of thirty days; was the fourth month of the old Latin calendar, and originally had but twenty-six days. Romulus is said to have given it thirty days. Numa made it the fifth month and deprived it of one day, which was restored by Julius Cæsar.

Juneau (jū-nō'), city of Alaska, on the promontory between Taku River and Lynn Channel; opposite Douglas Island; is a general supply station for the mining districts; has regular steamer communication with the principal Alaskan and other Pacific ports; and is near the famous Treadwell and Silver Bow mines.

June'berry, popular name of several wild shrubs or small trees found throughout the U. S. and Canada. They bear a considerable resemblance in their characteristics to the apple and pear. The species belong to the genus *Amelanchier*, the commonest one being *A. canadensis*. The fruit, which is of purple color, is sweet, and about the size of the largest currants. Various names are given to the juneberry in different localities, such as shadbush, serviceberry, and mountain whortleberry. The flowers are white, early, and abundant.

Jung (yŏng), **Joachim,** 1587–1657; German naturalist; b. Lübeck; was Prof. of Mathematics at Giessen, 1609–14; became a professor at Rostock, 1625, and rector of the Johanneum at Hamburg, 1628. Dr. Jung anticipated Linnæus in proposing a binomial nomenclature for plants, and wrote largely on philosophy, mathematics, mineralogy, invertebrates, and botany.

Jungfrau (yŏng'frow), one of the highest peaks of the Bernese Alps (13,672 ft.), and, on account of the beauty of its outline and the dazzling brightness of the everlasting snow

which covers its top, one of the most remarkable mountains of Switzerland. The summit was first reached 1811.

Jungmann (yōng'män), **Josef,** 1773-1847; Bohemian scholar; b. Hudlice; became president of the academic gymnasium at Prague, 1835; elected dean of the philosophical faculty of the Univ. of Prague, 1827 and 1838, and president, 1840; wrote a history of Bohemian literature and language; the "Slovnik," a dictionary of the Bohemian language; and published excellent translations of foreign literary masterpieces.

Juniata (jō ni ăt'ā), river in Pennsylvania; rises near Altoona, 1,155 ft. above sea level, and flows some 150 m. through the parallel-ridged mountains of S. central Pennsylvania; empties into the Susquehanna at Duncannon, 34[illegible] ft. above the sea, and receives as its principal affluent the Raystown branch, a beautiful and very tortuous stream.

Ju'niper, genus of conifers, of the family *Pinaceæ* and tribe *Cupressineæ*, characterized by having its small cone fleshy and berrylike. The common juniper is a small evergreen shrub, native of Europe and the U. S., where it grows on dry, sterile, hilly ground from New Jersey

[illegible] AND STAMINATE FLOWERS OF JUNIPER.

to Maine and along the Great Lakes and in the Rocky Mountains. It is important for its [illegible] which is used in medicine and in making [illegible], to which spirit it gives the peculiar flavor and diuretic action. *Juniperus virginiana*, or red cedar, is an indigenous and important evergreen tree growing on dry, rocky hills in all [illegible] of the U. S.

Junius (jōō'nyus) **Let'ters,** series of letters [illegible] which appeared in a London newspaper, *The Public Advertiser*, from [illegible] of 1766 to the middle of 1772. They [illegible] a pungency, a vehemence, an intre[illegible], and a power of invective such as had [illegible] been shown by any English polit[illegible] The first of these letters (April [illegible]) appeared under the signature of [illegible] "Mennon," "Lucius," "Junius," [illegible] "Brutus," and other signa[illegible] subsequently resorted to, but the [illegible] collection is concentrated on [illegible] "Junius," affixed to the most re[illegible] letters, and to those which alone (the [illegible] "Philo-Junius" excepted) the [illegible] authenticated by himself giving them to [illegible] world.

In these letters, Sir William Draper, the Duke of Grafton, and other members of the Ministry were denounced for their inefficiency, and every leading political occurrence of the day was turned to a vindication of popular liberty. The writer did not hesitate to asperse private character. The letters have been attributed to many men of intellect and position, but the evidence, though largely circumstantial and not absolutely conclusive, points to Sir Philip Francis as the author.

Junk, name of a kind of Chinese vessel, some having a tonnage of 1,000. The old type of junk had one large mast carrying a square sail of matting. Above water the junk appears to be clumsy, with high forecastle and poop, but it is a seaworthy craft and below the water its lines are often very well formed.

Junker (yōng'kĕr), **Wilhelm,** 1840-92; German explorer; b. Moscow, Russia, of German parentage. His first journey was to Iceland, 1869. In 1873-74 he was in Tunis; 1875-78, in the equatorial province and on the upper waters of the Welle, Africa; 1879-86, in the basins of the Bahr-el-Ghazal and of the Welle. His explorations were made from purely scientific motives, and were unusually complete geographically.

Ju'no, called by the Greeks HERA, in ancient mythology, a daughter of Saturn and Rhea, and the sister and wife of Jupiter. She was surnamed, by the Greeks and Romans respectively, Basileia and Regina, as the celestial queen; Gamelia and Pronuba, as the patroness of marriage; Eileithuia and Lucina, as presiding over childbirth. She was the mother of Mars, Hebe, and Vulcan. The chief seats of her worship were Argos, Samos, Sparta, and Rome.

Juno, third in order of discovery of the asteroids. It was found by Harding at the Lilienthal observatory, near Bremen, September 1, 1804. It shines as a star of the eighth or ninth magnitude, and is of a whitish color, and not nebulous. Its sidereal revolution is performed in 1,592.06 mean solar days. Its orbit is inclined to the ecliptic 13° 1′ 20″. Its diameter and magnitude are not well known.

Junot (zhū-nō'). **Andoche** (Duc d'Abrantès), 1771-1813; French military officer; b. Bussy-le-Grand; entered the army, 1792; accompanied Napoleon as aid-de-camp in Italy and Egypt; was made general of division and commander general of Paris, 1800; sent as ambassador to Lisbon, 1805, but soon joined the army in Germany, and distinguished himself at Austerlitz; invaded Portugal with an army, 1807, and captured Lisbon, his brilliant success leading Napoleon to make him Duke of Abrantès. He was defeated at Vimeiro by Wellington, 1808, and displeased Napoleon by concluding the convention of Cintra with the English; was made Governor of Illyria, 1813, but became deranged, was taken to France, and there died. His wife, LAURETTA DE SAINT MARTIN PERMON (1784-1838), has some literary reputation through her "Memoirs" and several minor works.

Junta (jūn'tā), meaning "association"; in Spain and Spanish American countries, any group of men combined for political or other purposes, especially applied to unofficial associations. The most famous junta was that of 1808 to defend Spain against Napoleon. Before and during the Spanish-American War a Cuban junta had its headquarters in New York, its object being to assist the Cubans to throw off the Spanish yoke. In English history the junta was a small coterie of Whig politicians who played an important part in public affairs under William III and Queen Anne.

Ju'piter, or Jove, in Roman mythology, the supreme god of heaven, whose name is connected etymologically with the Greek Zeus, with whom at a later time, in literature at all events, Jupiter is completely identified. As god of the sky, Jupiter was worshiped under a variety of epithets characterizing him as the god of thunder, lightning, rain, and other natural phenomena. In moral relations he was conceived of especially as the protector of the laws of hospitality and of good faith between individuals, as well as states. There gradually arose to a preëminent position the worship of Jupiter as the supreme protector and guardian of the state under the epithets optimus maximus (best and greatest). The Temple of Jupiter Optimus Maximus was located on the Capitoline, and was begun by the last of the kings, Tarquinius Superbus. It was a triple temple, in which, according to ancient conception, Juno and Minerva, the other occupants, were the guests of the greater god. The central part contained a clay statue of Jupiter standing, holding a thunderbolt in his right hand.

Jupiter, largest member of our planetary system, and the fifth in order of distance from the sun, so far as the primary members of the system (omitting the asteroids) are concerned. Jupiter travels at a mean distance of 475,692,000 m. from the sun, his greatest distance being 498,639,000 m., and his least 452,745,000 m. Jupiter circles round the sun in a mean period of 4,332.5848 days; and his mean synodical period (that is, the interval separating his successive returns to opposition) has a mean value of 398.867 days. Various estimates have been obtained of Jupiter's dimensions; but we may take 85,000 m. as the most probable extent (in round numbers) of his equatorial diameter. His polar diameter is considerably less, the compression of the planet being variously estimated at from $\frac{1}{14}$ to $\frac{1}{17}$. We may assume $\frac{1}{15}$ as approximately correct, according to which estimate his polar axis would be about 5,700 m. less than an equatorial diameter. His volume is about 1,235 times as great as the earth's; but his density being only about one fourth of the earth's, his mass does not exceed that of the earth in so considerable a proportion.

Jupiter rotates on his axis in rather less than ten hours. The appearance of Jupiter's disk suggests the idea that the planet is enveloped in a deep, vaporous atmosphere, heavily laden with cloud masses. A series of broad bands or belts, alternately dark and light, and differing in color, lie across the disk, agreeing generally in position with the latitude parallels of the planet. On a close study with the telescope, rounded clouds appear to float in a deep atmosphere, disturbed by terrific winds, calculated as traveling at the rate of 250 m. an hour. This is generally believed to be the effect of a condition of comparatively intense heat in which the planet still exists. In 1879 a bright-red spot, which had not before been noticed, formed on the S. hemisphere of Jupiter. It persisted, with some change of size, for nearly ten years, then faded away, but afterwards brightened up again, and is occasionally visible even now. The most remarkable feature of Jupiter is his five satellites, four of which were discovered by Galileo, and the fifth by Barnard at the Lick Observatory, 1892. This new satellite is so very faint that it can be seen only with the most powerful telescopes.

Jupiter Am'mon. See AMMON.

Ju'ra, one of the Inner Hebrides, belonging to Argyleshire, Scotland; area, 143 sq. m. The W. coast is rugged and precipitous; the E., sloping and pleasant. Oats, barley, and flax are raised and black cattle reared. Between Jura and Scarva is the whirlpool of Corrievrekin.

Jura, system of mountain ranges, generally from 5,000 to 6,000 ft. high, which cover parts of France, Switzerland, and Germany. They consist of a peculiar kind of limestone, called the Jura limestone, and are plentifully covered with fine pine forests. In the Swiss Jura are found many stalactitic grottoes, and caves abounding in bones of extinct animals. In several places large rivers, as the Orbe, Doubs, and Creuse, are lost and their courses concealed for some distance. The highest peak is Crêt de la Neige, 5,656 ft.

Jurassic (jū-rās'sīk) **Pe'riod,** division of geologic time following the Triassic period and preceding the Cretaceous. These periods together constitute the Mesozoic or middle era, and the Jurassic period thus stands midway in the great time scale characterized by fossils. The name is derived from the Jura Mountains, where the formations of the period are extensively developed. They also cover large areas in lowland districts of France, in Great Britain, in Germany, and in Russia. The two principal divisions are the Oölite, above and the Lias, below. Rocks of Jurassic age have been recognized in Colorado, Dakota, Montana, Wyoming, Utah, Nevada, California, and New Mexico, but only in N. California has it been possible to determine the upper and lower limits of the beds representing the period. In the chronologic scale adopted by the U. S. Geological Survey, 1890, the Jurassic and Triassic periods of the European scale are replaced by a single one called the Jura-Trias period.

Ju'ra-Tri'as Period, division of geologic time following the Carboniferous period and preceding the Cretaceous. As indicated by the compound name, the period includes the Jurassic and Triassic periods of the European chrono-

logic scale. On the E. seaboard of the U. S. are a number of areas of red shale and sandstone, constituting the Newark system. Red rocks of more varied texture encircle the Black Hills of Dakota, flank various ranges of the Rocky Mountains in Montana, Wyoming, and Colorado, and are widely exposed in plateaus of Texas, Utah, New Mexico, and Arizona. Rock series which are not red and which include much calcareous matter occur in W. Nevada and in California. The New England and New Jersey beds afford an important building material called brownstone, and good building stone has also been obtained from the red beds of the West at many points.

Jurien de la Gravière (zhü'rē-äṅ dē lä grä-vē-är'), **Jean Baptiste Edmond**, 1812–92; French naval officer; b. Brest; entered the navy, 1828; was engaged in the Chinese War; served in the Black Sea during the Crimean War; was made rear admiral, 1855. In 1861 he received the command of the squadron sent against Mexico in pursuance of the triple alliance between France, Great Britain, and Spain, and as imperial commissioner adjusted with the government of President Juarez the famous Treaty of Soledad, which was repudiated by Napoleon III. He became vice admiral, 1862.

Jurisdic'tion, in law, the power possessed by a person or body of men to dispose of a cause or question judicially. The jurisdiction of a court is exclusive when it is the only court by which the matter in question can be disposed of; and concurrent when it is one of two or more courts, either of which, indifferently, may entertain the cause. Jurisdiction is also original and appellate. It is original when a court entertains the cause in the first instance, appellate when it entertains a cause brought from another court. Under the jurisprudence of the U. S. Govt. the judicial power is prescribed in the Constitution. It is, for most purposes, left to Congress to determine in what courts it shall be vested. It is, however, provided that there shall be a supreme court, and that it shall have original jurisdiction in two classes of cases—one in all cases affecting ambassadors, other public ministers, and consuls, and the other in which a state shall be a party. In all other cases the court shall have appellate jurisdiction, with such exceptions and under such regulations as Congress shall make. The jurisdiction of a state court may or may not be prescribed in a state constitution. When there is no constitutional direction, the whole matter is within the control of the state legislature, which may in that case erect and abolish courts at will, and parcel out their jurisdiction according to its pleasure.

Jurispru'dence. See LAW.

Jurisprudence, Med'ical, called also FORENSIC MEDICINE, science which treats of the application of medical and correlative knowledge to the purposes and principles of common law, especially in its juridical relations. It is not state medicine, as some writers insist, but only one branch of it, the other being what is variously termed hygiene, sanitation, or the science of public health. The former considers essentially the individual rights of the person as related to society or to other individuals, and these are to be determined and sustained by the courts, the judicial element of the law; the latter, including all matters that pertain to the public health and the physical welfare of society, is the concern of the legislative and executive branches of government, the one enacting, the other enforcing such laws as may be necessary to preserve the health of the people at large.

The purpose of forensic medicine is to aid justice by showing the facts of the case and the inferences to be drawn therefrom by scientific medical investigation. Medico-legal evidence may be of two kinds: first, that from medical men whose connection with or relation to the case is the normal one of physician or surgeon; and, second, that of specialists or experts in certain branches, whose testimony is meant to make clear the facts or hypotheses presented by one side or the other.

Among the questions to be decided by a medical jurist is that of proving personal identity by such characteristics as sex, race, stature, age, complexion, color of eyes, scars, congenital markings, deformities, etc.; the capacity of parties to enter into a legally valid marriage; the facts surrounding motherhood and the legitimacy of children; and the presence or absence of insanity. The more dramatic cases of crime, with evidence as to the cause and effects of wounds and poisoning, are not as frequent as the instances in which the expert has to testify, in civil suits for damages, whether a person is really suffering or whether the symptoms are merely assumed to secure damages.

Juruá (zhö-rö-ä'), S. affluent of the upper Amazon; rising, presumably, in Peru; crossing a small portion of NW. Bolivia, at first E., and then in a curve to NNE., through the Brazilian state of Amazonas to its junction with the Amazon, near lat. 2° 30′ S. and lon. 65° 50′ W.; total length along the main curves probably not less than 1,000 m. Steamboats occasionally ascend to the Urubú Rapids, 564 m.

Ju'ry, Tri'al by. See TRIAL.

Jusserand (zhüs-ē-räṅ'), **Jean Adrien Antoine Jules**, 1855– ; French diplomat and scholar; b. Lyons; entered the Foreign Office, 1876; councilor of embassy at London, 1887–90; minister at Copenhagen, 1898–1902; ambassador at Washington after 1902; author of "The Theater in England from the Conquest to the Immediate Predecessors of Shakespeare," "English Wayfaring Life in the Middle Ages," crowned by the French Academy; "A French Ambassador at the Court of Charles II," "Literary History of the English People," "Shakespeare in France," etc.

Jussieu (zhü-sē-ēh'), **Adrien de**, 1797–1853; French botanist; b. Paris; succeeded his father, Antoine Laurent, as professor at the Museum in Paris, 1826; was for many years a brilliant lecturer, an able scientific writer, and one of the first botanists of his time.

Jussieu, Antoine Laurent, 1748–1836; French botanist and physician; b. Lyon; became a botanical professor in Paris; following his uncle Bernard, who made the sketch, was the first to introduce the natural system into botany, disposing all known genera in defined natural orders; author of "Genera Plantarum," 1789, and other works.

Jussieu, Laurent Pierre de, 1792–1866; French writer and moralist; b. department of Isère; member of the Chamber of Deputies, 1839–42; wrote educational and popular works for the diffusion of useful knowledge among the masses, including "Simon of Nantua," which passed through more than thirty editions, and "Antoine and Maurice," crowned by the Society for the Amelioration of Prisons; also "Fables and Stories in Verse," etc.

Juste (zhüst), **Théodore,** 1818–88; Belgian historian; b. Brussels; was secretary of the Belgian Board of Education, and a prolific writer on Belgian and French history; works include "History of the Belgian Revolution of 1790," "William the Silent," "The Founders of the Belgian Monarchy."

Jus'tice, Depart'ment of, one of the executive departments of the U. S. Govt. The office of Attorney-General of the U. S. was created by Congress, September, 1789, to embrace the various law offices of the government, whose function it was to interpret and apply the laws. Their officers—attorneys, marshals, reporters, and clerks—became members of the Department of Justice when it was organized in 1870. After the organization of the department they continued to interpret and apply the statutes governing the official business of the government, under the supervision of the attorney-general. By bringing these officers under one superior officer the interpretation of laws was made uniform. See ATTORNEY-GENERAL.

Justice of the Peace, or subordinate magistrate appointed to exercise certain judicial and administrative functions of a subordinate character within the limits of a county, borough, or town. In England, as a general rule justices of the peace serve gratuitously, but in the cities and larger towns certain of them, called stipendiary magistrates, receive a salary. In the U. S. justices of the peace are county or town officers—in some states elected by the people, in others appointed by the executive. Their terms of office are usually short—three or four years—and their compensation defined by law. Among their administrative functions are the keeping of the peace; they may arrest without warrant in certain cases, and issue warrants in others. Justices generally have power to take affidavits and acknowledgments of deeds, and in some states may celebrate marriages. Judicially they have power to try offenders charged with minor offenses, such as drunkenness, vagrancy, gaming, etc. Their civil jurisdiction is limited by statute to certain classes of cases, usually those involving an amount less than the maximum fixed by law.

Justifica'tion, strictly, a making righteous, but in the peculiar usage of Paul, in the epistle to the Romans, justification signifies the act of God's declaring men free from guilt and acceptable to him. As a theological term, justification came into prominence at the Protestant Reformation, and is thus defined in the first Protestant confession, the Augsburg: "Men cannot be justified (obtain forgiveness of sins and righteousness) before God by their own powers, merits, or works, but are justified freely for Christ's sake through faith. . . . This faith doth God impute for righteousness before him." Calvin wrote: "We simply explain justification to be an acceptance by which God receives us into his favor and esteems us as righteous persons; and we say that it consists in the remission of sins and the imputation of the righteousness of Christ." The Westminster Confession defines it as "accounting and accepting their persons as righteous, not for anything wrought in them or done by them, but for Christ's sake alone." The Arminians did not depart from these definitions, Limborch, for example, writing: "In the forensic sense it denotes declaration of righteousness, or absolution from fault and treatment as if righteous."

Jus'tin I, or Justi'nus, 450–527; b. Tauresium, Mœsia; Emperor of Constantinople; by birth a Gothic shepherd; went to Constantinople to seek his fortune; enlisted in the imperial guard; became commander; by craft and skillful management induced the army to salute him as emperor, after the death of Anastasius, 518 A.D. Under the advice of the quæstor Proclus his reign was on the whole a just one, and advantageous to the empire. He was succeeded by his nephew, Justinian, who had been associated with him in the government.

Justin II (FLAVIUS ANICIUS JUSTINUS), d. 578; Emperor of the East; succeeded Justinian I, his uncle, 565. In his reign occurred the dismissal and death of the exarch Narses and the occupation of nearly all of Italy by the Lombards. In the North the Avars gained great advantages, and in the East a bloody war went on with the Persians. The emperor was succeeded by Tiberius III.

Justin'ian the Great (FLAVIUS ANICIUS JUSTINIANUS), abt. 483–565; b. Tauresium, Mœsia; Roman emperor at Constantinople; was of Gothic peasant ancestry; went in youth to Constantinople, where his uncle, afterwards the Emperor Justin I, was in high favor; in 520 was appointed commander of the Asiatic armies, and, 521, consul; succeeded to the imperial throne, 527. His generals, Belisarius, Narses, and Germanus, carried the terrors of the Roman arms into Africa, where the Vandal kingdom was overthrown; into Italy, where the Goths and Lombards were conquered; into Persia, where, after a twenty years' struggle, Persia obtained a nominal triumph, but Constantinople gained the real victory. Constantinople and the whole empire was adorned with splendid buildings, of which the present mosque of Santa Sophia is the most famous. Silk

culture was introduced, and manufactures, agriculture, commerce, appeared to prosper. The greatest monument to Justinian's fame is the "Corpus Juris Civilis," the work of Tribonian and his assistants, but one which Justinian planned. He was continually involved in theological discussions, in the course of which he condemned several heretical writings, and anathematized their authors, but in his later years he himself lapsed into heresy.

Justinian II, surnamed RHINOTMETUS, 669–711; Roman emperor at Constantinople; succeeded Constantine IV, his father, 685, and was one of the worst of the Eastern emperors. Notwithstanding some splendid successes in Syria, Sicily, and among the Slavi, he abandoned the fruits of his victories; in 695 his nose was cut off (hence his surname), and he was banished to the Crimea, whence, 705, he returned and took fearful vengeance on all adversaries. During the insurrection of Philippicus Bardanes the emperor was killed.

Jus'tin Mar'tyr (FLAVIUS JUSTINUS), abt. 105–63; Christian apologist; b. Flavia Neapolis, the modern Nablous, in Samaria; studied philosophy in the schools of Asia Minor, Greece, and Egypt; but became dissatisfied, and, abt. 132, embraced Christianity, of which he became an able defender; is said to have become a resident of Rome, and to have been beheaded there; works include "Book against all Heresies," two apologies for the Christian religion, and a "Dialogue with Trypho," on the same subject.

Jutahy (zhö-tä-ē'), S. affluent of the Upper Amazon, entering about 100 m. above the Juruá. Its general course is almost precisely parallel to that of the Juruá. It is formed by the junction of two unexplored rivers, which meet at a distance of 450 m. from the Amazon.

Jute, fiber of *Corchorus capsularis* and other species; name also applied to the plant. The

JUTE PLANT.

genus *Corchorus* belongs to the order *Tiliaceæ*, which includes the linden or basswood; the species furnishing the fiber are annuals, natives of Asia, and grow about 10 or 12 ft. high. The fiber is contained in the bark of the stems, which are cut when the plant begins to blossom, and macerated in water until the fiber readily separates; this is from 8 to 12 ft. long, appearing like hemp, but much more soft and silky. Its great use is in making coarse bagging known as gunny; bags made of this are used in packing rice, coffee, and other Eastern merchandise for shipment, and in the U. S. for the transportation of agricultural products.

Jutes, a Low German tribe which took part in the expedition of the Saxons to England, and founded the Kingdom of Kent. As allies of the Saxons they waged war with Charlemagne, and under the name of the Northmen they devastated the coast of Germany and France. Until very recent times it was generally believed that they originated in Jutland.

Jut'land (Dan. JYLLAND), peninsula between the North Sea, the Skagerack, and the Cattegat, extending S. to the Eider, and embracing both N. Jutland and S. Jutland (Schleswig). In a more limited sense it means only N. Jutland, and as such is the largest province of the Kingdom of Denmark; area, 9,904 sq. m.; pop. (1906) 1,124,694; is divided into four districts: Aalborg, Aarhuus, Viborg, and Ribe; capital, Viborg; principal commercial emporium, Aarhuus.

Ju'venal, or **Juvena'lis, Decimus Junius**, abt. 56–140; Roman satirical poet. The only certain facts in his personal history are that Aquinum was either the place of his nativity or his chosen residence, and that he was an intimate friend of Martial. Juvenal disputes with Horace the honor of being the greatest Roman satirist. As he lived amid the vices of a declining state, his compositions are much more purposely and formally severe than the easy and good-humored satires of Horace. His extant works are fifteen satires, and a fragment of doubtful authenticity, all in heroic hexameters.

Ju'venile Courts, courts where the cases of juvenile offenders are considered apart from other cases; first established, abt. 1898, by Judge Ben Lindsey, of Denver, Col., and now in operation in many cities of the U. S. as well as in Great Britain. The reformation of the children, rather than their punishment, is undertaken, those sentenced being committed, as a rule, to reform schools or industrial institutions. Their imprisonment with older offenders, either before and after trial, is not allowed. Systems of supervision and parole, in the case of the majority, have been the means of saving multitudes who otherwise would have developed into criminals or vagrants. Where home relations are irretrievably bad, the child is placed in some other home, usually in the country.

Juven'tas, in Roman mythology, originally the goddess of young manhood, who from an early period had enjoyed a shrine in the cella of Minerva in the Capitoline Temple, and to whom offerings were made on the day of as-

suming the toga of manhood. From the time of the second Punic War, Juventas became identified with the Greek Hebe, the goddess of youth in general.

Jynx, in Greek mythology, name of the bird which Aphrodite gave Jason as a symbol of passionate and restless love, by which he won the love of Medea. According to one version of the myth, Jynx was the daughter of Peitho or of Echo and Pan, and was transformed into a bird because she undertook, by means of magic, to make Zeus fall in love with herself and with Io. According to another, she was a daughter of Pierus, and, when she and her sisters presumed to enter into a musical contest with the Muses, she was changed into a bird—the *Jynx torquilla*, or wryneck, which can twist its head and neck completely around and then untwist it with startling rapidity. Owing to this peculiarity magic power was ascribed to the bird.

K

K, eleventh letter of the Phœnician and other Semitic graphic systems, is also the eleventh of the English and many other European alphabets, although the letters preceding it do not exactly coincide in both systems. The sound of K is produced like that of G, with this difference, that the larynx does not oscillate during the sudden explosion of the sound. See ABBREVIATIONS.

Ka, according to the Egyptian conception, a genius, double, spirit; a something that continued to reside in the tomb as long as the mummy remained intact. The funeral offerings for which the tomb texts pray, and for which the deceased often made lasting provision, were intended for the sustenance of the *ka*. It is an independent spiritual existence which insures to man "protection, life, continuance, purity, health, and joy" so long as it remains present. Pictorially the *ka* is represented by the extended arms bent at a right angle upward from the elbows. The body must be preserved so that the *ka* may return to it at will, or at least an image of the dead must be within reach in a hidden recess in the tomb. These ideas explain the philosophy of the form and construction of the tombs as "eternal dwellings" for the dead.

Kaaba (kä-ä'bä), most sacred shrine of Islam, toward which, when praying, Mussulmans must turn their faces; "the point to which are directed and where are united all human prayers." It is an almost cubical structure, about 40 ft. each way, standing in the center of the vast seven-minareted mosque of Mecca, which has been built around it. The Arabs believed that the Kaaba was the direct gift of God to their ancestors, in sign that they were his chosen people, and that it was the favorite praying place of Abraham and Ishmael. Gradually it became the pagan pantheon of Arabia. Mohammed destroyed the idols collected in it after his triumphal return to Mecca. He did not injure the black stone which, still preserved in the Kaaba, receives the utmost veneration from the Mussulmans. This stone, of irregular oval shape and about 7 in. in diameter, is probably of meteoric origin. None but Mussulmans are allowed to approach the Kaaba, or even to enter Mecca and Medina, though several travelers have succeeded in doing so in disguise.

Kaarta (kär'tä), country of the W. Sudan; between the upper Senegal River and the Sahara, with ill-defined boundaries; area estimated at 21,000 sq. m.; pop. abt. 300,000. It is a fertile plain, formerly scattered over with villages, and covered with fields of millet, maize, rice, cotton, tobacco, indigo, and pulse. It belonged formerly to the Soninkis, but was conquered by the Bambaras, and, 1855, was taken and ravaged by the Sultan of Segu. It is now within the French sphere of influence. Capital, Nioro.

Ka'ba, or **Ka'bah,** site of an important ruined city of Yucatan; 12 m. SW. of Ticul. Its ruins have been investigated by Stephens, Charnay, and others. These ruins are not mentioned in history, but their character shows that the city must have been a very important one. The ruins consist of great pyramids, immense terraces surmounted by buildings, triumphal arches, and fine palaces.

Kab'ala. See CABALA.

Kabul (kä'bōl), capital of Afghanistan; on the Kabul River, here crossed by three bridges; 80 m. NE. of Ghazui; about 6,400 ft. above sea level. The citadel, Bala Hissar, or upper fort, on a hill SE. of the town, contains the palace of the emir, royal gardens, government offices, and other buildings. The town is divided and subdivided by walls, with narrow gates. The houses, built of sun-dried bricks and wood, are two or three stories high. The climate is severe during the winter. The caravans between Persia and India pass through the city. Iron ware, leather, cotton, and shawls are manufactured. Under the Emperor Baber, Kabul was the capital of the Mogul Empire. It was taken by Tamerlane abt. 1400, by Nadirshah, 1738, and by the British, 1839; the Afghans massacred the British garrison, 1842; Shere Ali took it from his revolted brothers, 1868, and the British again took it, 1879. Pop. abt. 60,000.

Kabyles (kä-bēlz'), group of Berber tribes occupying N. Algeria, from not far E. of Algiers to Cape Bugaroni. So much of this region as is in the province of Algiers is called Great Kabylia; that in the province of Constantine is Little Kabylia. There are about 1,400 villages, comprising 450,000 to 500,000 individuals. The villages are combined into

about 120 tribes, each ruled by its elective *amin*, and several tribes unite into a protective confederation. The language of the people is Berber, but this and the blood are much mixed. The Kabyles are Mohammedans, and education among them, which is very limited, is essentially Arabic. They are especially devoted to agriculture, but are skillful with tools. See BERBERS.

Ka'desh, or Kadesh-Bar'nea, place of special interest in biblical geography; was the third station of the Israelites in their march from Sinai to Canaan; its original name appears to have been Rithmah. Thence the spies went out, and here the people murmured and were turned back to wander in the desert for nearly thirty-eight years. After seventeen encampments in the penal wandering, they returned to Kadesh, and set out from there for Jericho.

Ka'di. See CADI.

Kadiak (kăd-yăk'). See KODIAK.

Kaf'fa, extreme S. projection of the Abyssinian highlands; an extensive table-land rising about 5,000 ft. above the sea. Coffee is indigenous here, and is said to have received its name from this country. The inhabitants belong to the black Galla race, speak a language classified under the Hamitic group, and profess to be Christians. Bonga, on the Gojeb, is the principal town. Kaffa is tributary to Shoa.

Kaffa, or Feodosia (fä-ō-dō'sē-ä), town in the government of Taurida, Russia; on the E. coast of the Crimean peninsula; has a good fortified harbor, and was, while in the possession of Genoa, a commercial port of consequence, but lost its importance under Turkish dominion. It is much visited as a watering place. Pop. (1897) 27,238.

Kaffra'ria ("land of the Kaffirs"), large part of S. Africa inhabited by the branch of the Bantu family known as the Kaffir tribes; extends from the Portuguese possessions, centering at Delagoa Bay to the W., embracing the S. coast regions, the Orange River Colony, and the E. part of Cape Colony. The natives of Basutoland and Bechuanaland are kindred, though their common language differs widely from the Zulu and Xosa (Kaffir proper) tongues. In a more restricted sense, the name Kaffraria applies to that part of the coast, thus designated on the maps, lying between the W. border of Natal and the Great Kei River. Since 1884 it has been a part of Cape Colony. The name Kaffraria has now no official significance.

Kafiristan (kä-fē-rēs-tän'), name of variable signification. Sometimes it is applied to the territory of all the infidel tribes on both slopes of the Hindu Kush, sometimes to those only of the S. slope, and at other times to the country of the Siaposh, who occupy the higher valleys on the S. slope from N. of Kabul to Kashgar. In all its meanings it forms a part of modern Afghanistan, though the tribes included are generally independent. With the last meaning it covers an area of about 5,000 sq. m. The people number abt. 200,000. The chief interest in them lies in the tradition (which is not aboriginal, however) that they are descendants, of fairly pure blood, of Greeks who came with Alexander.

Kaga (kä'gä), province of central Japan; on the W. coast just S. of the promontory of Noto. Its daimios, whose family name was Mayeda, were among the wealthiest in the empire, and are marquises under the new régime. The principal town is Kanazawa, 10 m. S. of which the main river, the Tetorigawa, 50 m. in length, enters the sea. Kaga is isolated from the rest of the empire by high mountain ranges, and depends mostly on sea communication, its best port being Nanao. It has manufactures of silk, cotton, bronzes, cutlery, fans, but is especially noted for the celebrated Kutani or Kaga ware (dating from 1650 A.D.), which has a smooth white finish, and is ornamented in red and gold, probably the most generally attractive to foreigners of all Japanese porcelains.

Kagoshima (kä-gō-shō'mä), city of Japan, on the island of Kiushiu, and formerly the castle town of the powerful daimio of Satsuma. During the troubles attending the opening of Japan the daimio of Satsuma was directly involved with foreign powers, owing to the murder of Richardson, 1862, on the Tokaido by swordsmen in his train. This act led to the bombardment of Kagoshima by a British fleet, August 15, 1863, in which the palace of the daimio and many other buildings were destroyed. Kagoshima was also the focus of the Satsuma rebellion under Saigo, 1876–77. The manufacture of pottery is carried on in the neighborhood, which is noted for the celebrated crackled Satsuma ware. Pop. (1903) 59,001.

Kailas (kī-lăs'), sacred mount of the Hindus; the Mt. Meru of Sanskrit literature; culminating peak of the Gangri Mountains in Tibet, not far from the sources of the four great rivers, the Sutlej, Indus, Ganges, and Brahmaputra; altitude, 14,000 ft.

Kairwan (kīr-wän'), city of Tunis, Africa; 30 m. WSW. of Susa, the nearest port, with which it is connected by rail; 80 m. S. of the city of Tunis; is built on a sandy plain; has a large caravan trade; contains many elegant structures, including the Akbar mosque and monuments of a splendor of bygone days; is regarded by Mohammedans as the most holy city in Africa; was occupied by the French, 1881. Pop. abt. 26,000.

Kaisariyeh (kī-zär-ē'ē), ancient *Cæsarea-Mazaca*; the capital city of Cappadocia, Asia Minor; lies in the plain not far from the foothills of Mt. Argæus, and is still a city of considerable importance. When Tiberius incorporated Cappadocia into the Roman Empire the name of the city was changed from Mazaca to Cæsarea, a name which has clung to it. It became the chief Roman mint in Asia, and hence coins of Cæsarea are very common. Pop. (1900) 72,000.

Kai'ser Wil'helm's Land, German part of New Guinea, the N. part of the E. end; declared a German protectorate, 1884; with Long,

Dampier, and some other small islands, has an area of about 70,000 sq. m.; pop. (1900) 110,000; is under the control of the German New Guinea Company, with an imperial commissioner as chief executive.

Kalahari (kä-lä-hä'rē) **Des'ert,** region of S. Africa, between the Orange River and lat. 20° S. Its average elevation above the sea is 600 ft. It is not wholly devoid of vegetation, being refreshed by heavy dews, though almost entirely rainless.

Kalakaua (kä-lä-kow'ä), **David,** 1836–91; seventh king of the Hawaiian Islands; b. Honolulu; was the son of C. Kapaakea and Keohokalole, and descended on his mother's side from Keawe, an ancient king of the island of Hawaii. On the death of Lunalilo, February 3, 1874, without proclaiming a successor, Kalakaua was elected by the legislature, and installed as king, February 12th. In 1881 he made a tour of the world, in which he met most of the potentates of Europe. He arranged on his return for a formal coronation, which occurred February 12, 1883, with much pomp. He built a beautiful palace at a cost of $350,000, spent $75,000 in celebrating his fiftieth birthday, and $60,000 on the funeral of a relative. As a consequence, his little nation was nearly forced into bankruptcy. In 1887 Queen Kapiolani and Princess Liliuokalani went to England to arrange for a loan. A rebellion broke out in their absence, and the king was obliged to grant a new constitution limiting his own powers and establishing ministerial responsibility. He died in San Francisco while visiting the U. S.

Kalama'ta, town of Greece, capital of the nomarchy of Messenia; 1 m. from the Gulf of Koron in the S. of the Peloponnesus. Wool, raw silk, oil, cheese, and figs are exported. It is supposed to occupy the site of ancient Pheræ. It became important during the crusades, was annexed to Venice, and was held by Turkey for a century till 1821, when it was among the first towns delivered by the Greeks, and the first where a Grecian legislative assembly was convened. Pop. of commune (1896) 20,309.

Kalamazoo', capital of Kalamazoo Co., Mich.; on the Kalamazoo River; 40 m. E. of Lake Michigan; has excellent water power for manufacturing from the river; is the jobbing and general trade center of a large farming section, and one of the largest celery markets in the world; and contains Kalamazoo College (Baptist), Michigan Female Seminary (Presbyterian), Nazarette Academy (Roman Catholic), State Insane Asylum, Children's Home, Home for Feeble-minded Children, Industrial School Home, Home for Erring Girls, and Queen City and Borgess hospitals, art gallery, driving park, and several libraries. Pop. (1904) 29,728.

Kalamazoo Riv'er, stream which rises in Hillsdale Co., Mich., flows generally WNW. to Kalamazoo, and thence NW. to Lake Michigan; is 200 m. long, 350 ft. wide at its mouth, and is navigable 40 m.

Kalät'. See KHELAT.

Kale, variety of *Brassica oleracea*, the species of cruciferous plant to which the cabbage, cauliflower, etc., belong. There are many varieties, some attractive in color and in the curly and crinkled character of the foliage. Kale is grown in kitchen gardens for its leaves, which are boiled as pot herbs. The plant is often called borecole.

Kaleidoscope (kä-lī'dō-skōp), optical instrument for multiplying the reflected images of small colored objects, producing by the symmetry of their arrangement patterns of great beauty. When two oblong mirrors of the same dimensions are placed so as to hinge together along an edge of each, their reflecting surfaces facing each other, and are then opened, so as to make an angle which is an aliquot part of 180°, an object placed between the planes of the mirrors, or in contact with one of the extremities of the pair, is reflected from one mirror to the other, and produces as many images as the angle of the opening is contained times in 360°. Kaleidoscopes are also made with three, four, five, or more mirrors. Three mirrors only should be arranged to make the three angles of 60° each, or two of 45° each and one of 90°, or one of 30°, one of 60°, and one of 90°. By the first arrangement, the images appear in groups of three repeated throughout the pattern; by the second the pattern is divided into square compartments; and the third produces a hexagonal pattern. The instrument is of considerable use in the arts as an aid in devising new patterns and other decorative purposes.

Kalevala (kä-lē-vä'lä), national poem of Finland. The name was the invention of Elias Lönnrot, to whom is due the present form of the work. It signifies the "home of Kalevas," or heroes; though originally "Kaleva" was a mythical gigantic personage, whose sons, not in the physical, but in the poetical sense, were all heroes. The material out of which the "Kalevala" was made by Lönnrot was the body of Finnish popular song, known either by the generic name for all poetry, *laulu*, or by the more characteristic designation for traditional and unartificial compositions, *runo*. This popular verse includes not only poems of an heroic or legendary character, but also magic formulas, marriage songs, and other songs for special occasions. The cultivation of such poetry was, until a very recent time, universal in Finland.

Kalgan', walled city in province of Chili, China; 125 m. NW. of Peking; at the foot of the Great Wall, on the Mongolian frontier, and on the regular caravan route from Peking to Urga and Kiachta; has little trade of its own, but has a large transit trade, being the terminus of transportation from the N. and S. Pop. est. (1900) 70,000.

Kalguev (käl-gō'yĕf), or **Kolgu'ev,** island in the Arctic Ocean, belonging to the government of Archangel, Russia; 75 m. NE. of Kanim peninsula; area, 1,350 sq. m.; is inhabited only by a few Samoyed families, but visited each summer by a great number of fowlers on account of the multitude of eider ducks, swans,

and geese which breed here, whose feathers and eggs are very valuable.

Kalidasa (kä-li-dä'sä), Indian poet, who, according to tradition, lived at the court of King Vikramaditya, in the first century B.C.; but by many scholars is believed to have flourished in the eleventh century A.D. at the court of King Bhoja. His best production is the drama "Sakuntalâ," which was translated into English by Sir William Jones, 1789, and immediately excited in Europe a lively interest in Sanskrit literature.

Kal'ikat. See CALICUT.

Kalisch (kä'lish), **David**, 1820–72; German humorist, of Jewish parentage; b. Breslau; founded in Berlin, 1848, the *Kladderadatsch*, a satirical newspaper, which he edited jointly with Dohm; wrote several popular plays.

Kal'mar, or **Cal'mar**, old, interesting, and well-built town of Sweden; on an island in Kalmar Sound; connected with its suburbs on the mainland by a long stone bridge; has a good harbor, considerable trade, and manufactures. In its castle, now decayed, the treaty was signed, 1397, by which Queen Margaret of Denmark united the three Scandinavian kingdoms, Sweden, Norway, and Denmark, under one crown.

Kal'mia, genus of shrubs of the family *Ericaceæ*, evergreens and natives of N. America. The U. S. has five species, of which the mountain laurel, spoon wood, or calico bush

KALMIA LATIFOLIA.

(*Kalmia latifolia*), is the best known. It is a large, handsome shrub, with beautiful flowers, highly ornamental in cultivation. The leaves of *K. angustifolia* have been employed in medicine.

Kal'mucks. See CALMUCKS.

Kalu'ga, town of European Russia, capital of the government of Kaluga; on the Oka; 76 m. NW. of Tula; has very important manufactures of sailcloth and leather, and an extensive trade in corn. Pop. (1907) abt. 49,513.

Kama (kä'mä), river of European Russia; rises in the government of Viatka; flows through Perme, Orenbourg, and Kasan, where, after a course of 1,100 m., it joins the Volga; is navigable 40 m. from its source, and forms an important line of traffic.

Kamaku'ra, village in Japan, on the seacoast; 12 m. S. of Yokohama; once a famous city, and the seat of the early shoguns, or military governors of the empire; was founded by the shogun Yoritomo, representative of the Minamoto family, who died 1199 A.D., a notable general and the organizer of military feudalism. When the Ashikaga shoguns established themselves at Kioto, 1338, Kamakura remained the capital of the north, known as Kuanto; but in the middle of the fifteenth century it began to dwindle in importance. The temple of Hachiman, the Japanese god of war, in Kamakura, still retains its popularity, and contains some valuable relics of mediæval times. Not far off is situated the gigantic bronze statue of Daibutsu, probably over eight centuries old. It is 49 ft. 7 in. high; the thumbs are 3 ft. in circumference, the eyes 4 ft. in length, and of pure gold.

Kamba'lu, or **Camba'luc**, capital of China, and the residence of the Mongol emperors, 1234–1368, when the Yuen or Mongol dynasty was superseded by a purely native one called Ming. It was rectangular in shape, and corresponded in part with that portion of the present city of Peking which is known as the "Tartar City." Kambalu was visited and described by Marco Polo and other Europeans in the thirteenth century.

Kamchat'ka, peninsula of SE. Siberia; 850 m. long, and at its greatest width 250 m. broad; extending between the Sea of Kamchatka and the Sea of Okhotsk, and terminating in a long, narrow tongue forming Cape Lopatka; it is traversed from N. to S. by a range of volcanic mountains whose craters mostly are extinct. The inhabitants, from 7,000 to 8,000, are Kamchadales, Koryaks, and Lamuts, who live by hunting and fishing. Bears, sables, foxes, otters, beavers, seals, and salmon abound. The only domestic animal is the dog, a peculiar species, large and strongly built. Russians made their first settlements in the country in the sixteenth century, and, 1855, it was incorporated with the Maritime Provinces. The principal town is Petropaulovski, on the E. coast, on the shores of one of the finest natural harbors in the world.

Kamehameha (kä-mé-hä'mé-hä), name of five kings of the Hawaiian Islands, who follow: KAMEHAMEHA I (NUI, the Great), 1753–1819; became head chief of the W. part of Hawaiian Islands, 1781; established his authority over the whole island, 1796, and ultimately over the entire group; introduced many reforms, and encouraged agriculture and commerce. KAMEHAMEHA II (LIHOLIHO), 1797–1824; eldest son of the preceding; under the influence of American missionaries, abolished idolatry, accorded them many privileges, and encouraged their efforts to educate the people; with his queen, died in London. KAMEHAMEHA III (KANIKEAOULI), 1814–54; brother of the preceding; granted a liberal constitution;

greatly encouraged the advancement of education and civilization among his subjects, and successfully resisted the encroachments of the French and English. KAMEHAMEHA IV (ALEXANDER LIHOLIHO), 1834–63; adopted son of the preceding; succeeded, 1854; married Emma, adopted daughter of Dr. T. C. B. Rooke, 1856; both he and his queen were better educated than his predecessors; took an active interest in the introduction of the Reformed Catholic Mission; established the Queen's Hospital in Honolulu with subscriptions personally solicited, and translated the "Book of Common Prayer" into Hawaiian. KAMEHAMEHA V (LOT), 1830–72; eldest brother of the preceding; had been Minister of the Interior and commander of the army; on coming to the throne refused to take the oath to the constitution of 1852, holding it to be too democratic for the good of his people; set aside this constitution and proclaimed a more absolute one, 1864; gave liberal aid to the Reformed Catholic Mission and its schools; died unmarried, and the direct line of the Kamehamehas ended with him.

Kameke (kä'mĕ-kĕ), **Georg Arnold Carl von,** 1817–93; Prussian general; entered the military service, 1834; 1856–58 was military *attaché* to the Prussian ambassador at Vienna; then appointed chief of the engineering department of the Ministry of War; 1863, became chief of staff of the Eighth Army Corps, and, 1865, major general and chief of staff of the Second Army Corps. In this position he took part in the war of 1866 against Austria. In the war of 1870–71 with France he first commanded the Fourteenth Infantry division, occasioned the battle of Saarbrücken (August 6, 1870), and took part in the battles of August 14th, 16th, and 18th. On the surrender of Metz he was ordered to take Thionville, and lay siege to Mezières and Longwy, and then to Paris to superintend the works during the siege; Minister of War, 1873–83.

Kamerun', German protectorate in Africa; between British Nigeria and the French Kongo; extends from the coast NE. to the S. shore of Lake Chad; area, est., 191,130 sq. m.; pop., est., 3,500,000; native pop. comprises Bantu negroes near the coast and Sudan negroes inland; seat of government, Buea; administration is under an imperial governor and a local council of merchants. There are government schools at Duala and Victoria, and four missionary societies have about 300 schools, with 10,000 pupils. The chief productions are cocoa, rubber, vanila; cattle raising is carried on in the interior; numerous factories promote active trade in ivory and palm oil; gold and iron have been found in the colony; railway, telegraph, and telephone systems are in operation. The colony has been under German protection since 1884. The KAMERUN MOUNTAINS are an isolated group, the highest in W. Africa, standing immediately on the coast to the N. of the Kameruns estuary. They are volcanic, and culminate in twin peaks reaching a height of 13,000 or 14,000 ft. The KAMERON RIVER is properly an estuary, formed at the common mouths of the Mungo and smaller streams.

Kames (kāmz), **Henry Home** (Lord), 1696–1782; Scottish philosopher and jurist; b. Kames, Berwickshire; became a judge of the Court of Session, with the title of Lord Kames, 1752, and, 1763, became a lord of justiciary; his fame mainly rests on the "Principles of Morality and Natural Religion," and especially on the "Elements of Criticism," a work which had a wide influence.

Kames. See DRIFT.

Kaministiquia (kă-mĭ-nĭs-tĭ-kē'ä), river of Thunder Bay district, Ontario, Canada; one of the largest tributaries of Lake Superior, coming in from the NW. at Fort William, Thunder Bay; is a very picturesque stream, and about 25 m. from Fort William are the beautiful falls of Kakkabeka. The river formerly afforded the N. canoe route to Rainy Lake and the Northwest, and the Canadian Northern Railway now passes up its valley.

Kam'pen, Nikolaas Godfried van, 1776–1839; Dutch historian; b. Haarlem; mastered several languages; became Prof. of the Dutch Language, Literature, and History, Univ. of Leyden, 1816; chief works, "History of the Literature of the Netherlands," "History of French Domination in Europe," and "History of the Influence of the Netherlands Outside of Europe."

Kamp'ti, city of the Central Provinces, British India; 8 m. NE. of Nagpur; was established, 1821, and has gradually grown up around a British cantonment; is one of the most important civil and military centers of the Central Provinces; has an important trade, five mosques, and seventy Brahmanic temples. Pop. (1901) 51,000.

Kanagawa (kä-nä-gä'wä), town and prefecture of Japan; on Yedo Bay, 16 m. from Tokyo. Formerly of importance as a halting place and as a port, it was the first port opened (1859) to foreign trade. Yokohama, 2 m. across what was then a bay, but is now closed in, actually became the port, although Kanagawa nominally remains so. Near Kanagawa is the spot where Urashima, the Japanese Rip Van Winkle, is said to have been buried. Pop. of town abt. 12,000.

Kana'ka, name applied, usually in contempt, to a native of Polynesia, more especially to one of the Hawaiian Islands.

Kan'ara, narrow strip of territory in British India; between the Arabian Sea and the W. Ghats; varies in breadth from 6 to 20 m.; is divided into two parts administratively. N. Kanara is in the Bombay Presidency; area, 3,911 sq. m.; pop. abt. 430,000. S. Kanara is in Madras; area, 3,902 sq. m.; pop. 965,000. The population is mostly Dravidian, who speak the Kanara language in the N. and center, the Tuluva in the S. In religion they are Brahmans, Mohammedans, Jains, Christians, and Jews. The Christians are in part descendants of the old Portuguese colonists, in part recent converts.

Kánaris (kä'nä-rĭs), **Constantine,** 1790–1877; Greek naval hero; b. island of Ipsara; commanded a small merchant vessel when the war

of independence broke out. On June 19, 1822, he burned a Turkish squadron in the canal of Chios; on November 22d another in the harbor of Tenedos; on August 17, 1824, a third at Cape Trogilion. In 1825 he conceived the bold idea of burning the Egyptian fleet which lay at anchor in the harbor of Alexandria, ready to convey the troops of Mehemet Ali to the Peloponnesus. The attempt failed, however. In 1826 he commanded the frigate *Hellas*, and, 1827, a whole squadron, with which he drove the Turkish flag out of Greek waters. Under King Otho and King George he was constantly a member of the Greek Diet, and held the office of Minister of War several times.

Kanawha (kä-nä'wä) **Riv'er**, river of W. Virginia, formed by the junction of Gauley and New rivers; flows NW. for 98 m. through a picturesque region, abounding in coal, iron, and salt, and joins the Ohio River at Point Pleasant. By a system of locks and movable dams, constructed at a cost of $4,000,000, slackwater navigation is maintained on it throughout the year to within 2 m. of its source.

Kanazawa (kä-nä-zä'wä), name of several towns of Japan, of which the most important is the chief town of Kaga, on the W. coast, just S. of the promontory of Noto; formerly the castle town of Mayeda, one of the wealthiest and most powerful daimios of the empire; now capital of Ishikawa prefecture. Here are the potteries where the highly prized red and gold porcelain known as Kaga-ware is made. Pop. (1903) 99,657.

Kandahar', capital of central Afghanistan; in a fertile plain, 220 m. SW. of Kabul; is well supplied with water by two canals; has an extensive trade and some manufactures. About 2 m. N. is a precipitous rock, crowned by a strong fortress or citadel. Kandahar is supposed to have been founded by Alexander the Great; was captured by Tamerlane, 1384, and by Shah Abbas of Persia, 1620. The British army occupied it 1839–42 and 1880, and several severe engagements took place in the vicinity. It is of great strategic importance. Pop. (1900) 50,000.

Kan'dy, or **Can'dy**, town of Ceylon; nearly in the center of the island; on an elevation 1,713 ft. above the sea; has many Christian churches, Buddhist temples, and Mohammedan mosques. Pop. (1900) 26,519.

Kane, Elisha Kent, 1820–57; American explorer and scientist; b. Philadelphia; took his medical degree, 1842; entered the navy; was physician to the Chinese Embassy; traveled in Asia, the Levant, and W. Africa; served in the Mexican War; sailed, 1850, under De Haven, in the first Grinnell expedition in search of Sir John Franklin; commanded the second Grinnell expedition (1853–55), and reported that he had discovered an open polar sea. For this expedition he received several gold medals and other distinctions.

Kangaroo', name given to numerous species of marsupial or pouched animals belonging to the family *Macropopidæ*, but more especially to the large species of the genus *Macropus*. They are found in Australia chiefly; also in Tasmania, New Guinea, and a few of the adjacent islands. The kangaroo is characterized by a remarkable disproportion between the anterior and posterior extremities, and particularly by the presence in the region of the abdomen of a curious pouch, within which are the mammæ. The male is without this development. The hind feet are provided with four

GREAT KANGAROO.

toes, the middle one being much larger than the others, of great strength, and provided with a hooflike claw. An examination of these stout and extremely long hind limbs show how well adapted they are to aid the creature in its wonderful leaps. The fore legs are very short, and are provided with bent claws with which they hold food when eating. These animals are easily tamed, and are harmless and timid, though when brought to bay in the wild state they fight with great power, using their tail and hind feet. The flesh of the kangaroo is esteemed a delicacy. See MARSUPIALS.

Kanin', large peninsula of Arctic Russia, just E. of the White Sea; formerly an island; is inhabited by a few Samoyeds.

Kano', most important town of the former Empire of Sokoto, in the Sudan, Africa; has large manufactures of cotton and leather. Its people are chiefly Haussas. A wall 26 ft. high surrounds the town, which consists of large, square adobe houses ranged in wide, clean streets. It has large trade relations with other points in the Sudan and with Constantine, Tunis, and Tripoli. Pop. (1900) 35,000.

Kan'sas, popular name GARDEN OF THE WEST; state flower, sunflower; state in the N. central division of the N. American union; bounded N. by Nebraska, E. by Missouri, S. by Oklahoma, W. by Colorado; length, E. to W., 391–410 m.; greatest breadth, 200 m.; area, 82,080 sq. m.; pop. (1906) 1,612,471; capital, Topeka; principal cities and towns, Kansas City, Topeka (capital), Wichita, Leavenworth, Atchison, Lawrence, Fort Scott, Galena, Pittsburg, Hutchinson, Emporia, Parsons, Ottawa, Newton, Arkansas City, Salina, Iola, and Winfield.

The surface is an undulating prairie, broken

in places by narrow river valleys, rising on the W. boundary S. of Smoky Hill Fork to a trifle over 4,000 ft. Along the E. boundary the elevation is about 1,000 ft. Except in the E. part there is very little timber. The Missouri River forms the N. third of the E. boundary, turning E. where the Kaw or Kansas flows into it. The Kaw traverses the state from E. to W., receiving the Scammon, Republican, Big Blue, Little Blue, Smoky Hill, and Saline. The Osage waters the E. and SE. portions, finally joining the Missouri. In the same parts are the Neosho, Walnut, Big Verdigris, and Little Verdigris, affluents of the Arkansas, which,

entering from Colorado, flows ENE., then SE., and finally S. as it crosses the S. boundary. None of the rivers is navigable except the Missouri, although small boats have ascended the Kaw as far as Topeka, 70 m.

The soil consists chiefly of alluvium of the river bottoms, from 3 to 50 ft. in depth, and the dark, rich prairie soil of the uplands. In the river valleys there are upper and lower river bottoms. The extreme W. portion of the state has a very light rainfall, but yields abundantly with moderate irrigation. The climate is mild and healthful; cold is sometimes severe in winter, but is of short duration. The summer heat is not severe, and is tempered by cool breezes after nightfall. The mean temperature is greater in the E. portion than in the W. There is a great deal of high wind, mostly from the S. and SW., but Kansas has experienced a few storms known as cyclones.

The principal farm crops, 1906, were: Corn, 195,075,000 bushels, valued at $62,424,000; winter wheat, 78,516,540, $45,539,593; spring wheat, 3,314,071, $1,922,161; oats, 24,780,000, $7,681,800; barley, 8,436,500, $2,784,045; rye, 1,026,272, $513,136; flaxseed, 533,000, $469,040; potatoes, 6,715,000, $4,700,500; and hay, 2,206,917 tons, $13,793,231—total value, $139,827,506. The livestock (1907) comprised 1,085,750 horses, value $96,848,928; 140,390 mules, $14,468,598; 729,274 milch cows, $20,419,672; 764,700 other cattle, $73,844,591; 233,581 sheep, $977,537; and 2,561,200 swine, $21,001,840—total value, $227,561,166. Lead and zinc are found in the extreme SE. portion and near Galena. Bituminous coal is found in nineteen counties, that of the SE., known as Cherokee coal, being the best. Other mineral products include sandstone, limestone, rock salt, gypsum, fire clay, and petroleum. Natural gas is abundant, and there are many mineral springs. Total value of mineral products (1907), $28,577,044, including zinc, $1,634,300; coal, $11,159,698. According to the U. S. census of 1905, Kansas had 2,474 factory-system manufacturing plants, operating on a capital of $88,680,117, and yielding annual products valued at $197,394,992. After slaughtering and meat packing, the chief articles were soap, candles, condensed milk, flour, lumber, foundry and machine-shop products, carriages and wagons, furniture, saddlery and harness, lime, paint, plaster, castor and linseed oils, dressed stone, brick, glass, and sugar from beets and sorghum.

The leading educational institutions are the State Univ., Lawrence; State Agricultural College, Manhattan; State Normal School, Emporia; Washburn College (nonsectarian), Topeka; Baker Univ. (M. E.), Baldwin; Emporia College (Presb.), Emporia; Wesleyan Univ., Salina; Ottawa Univ. (Bap.), Ottawa; SW. Kansas College (M. E.), Winfield; Bethany College (Luth.), Lindsborg; and normal colleges at Great Bend and Fort Scott. Leading religious denominations: Methodist Episcopal, Roman Catholic, Baptist, Disciples of Christ, Presbyterian, United Brethren, Congregational, Friends, and Lutheran. The charitable, reformatory, and penal institutions include State Insane Asylum, Topeka; State Insane Asylum, Ossawatomie; State Reform School, Topeka; Institution for the Deaf and Dumb, Olathe; Institution for the Education of the Blind, Kansas City; State Asylum for Idiotic and Imbecile Youth, Winfield; Soldiers' Orphans' Home, Atchison; Industrial School for Girls, Beloit; State Penitentiary, Lansing.

That portion of the state lying E. of the 100th meridian originally formed part of the Louisiana Purchase of 1803, and at different periods was included in the Louisiana and Missouri territories. A part of the SW. portion, after the settlement of the boundary line, 1819, belonged to Spain, and was a disputed territory, 1845–50. The first exploration in Kansas on record was that of Coronado in his search for Quivira, and it is known that he marched across the state from the SW. as far as Junction City. The famous Santa Fé trail, which crossed the state, was traversed 1822–43 by thousands of immigrants. In May, 1854, Congress organized the Territory of Kansas and Nebraska, declaring the Missouri Compromise of 1820, which had prohibited slavery N. of lat. 36° 30′, except in Missouri, inoperative and void. Companies of immigrants sent out by associations in Massachusetts, Connecticut, and New York hurried into the state; meantime inhabitants of Missouri had passed over the line and preëmpted large tracts.

From this time on a struggle existed between the two parties, one holding that Kansas should be settled by free men and that slavery should not exist on its soil; the other persisting in the right to establish their cherished institution wherever they chose. For

four years the territory was greatly disturbed by the conflicts of these parties. Lawrence was twice besieged and once burned. Pottawatomie, Ossawatomie, and Leavenworth were partially destroyed. Andrew H. Reeder, the first Governor of Kansas, issued the first election proclamation, November 10, 1854, and the first territorial election was held for a delegate to Congress, November 28th, in which there were a large number of illegal votes cast by persons passing over the Missouri border into Kansas. On March 30, 1855, an election took place for the first territorial Legislature, and was sharply contested by the proslavery and free-state parties. It resulted in the triumph of the proslavery party. An investigation took place, and a new election, ordered for Districts 1, 2, 3, 7, 8, and 16, took place, May 22d. The territorial Legislature first assembled at Pawnee, July 2d, and adjourned to meet at Shawnee Mission, July 16th, when the proslavery majority unseated the free-state members. Free-state conventions were held at Lawrence, August 14th, and at Big Springs, September 5th, the latter to nominate congressional delegates, and a free-state election was held, October 9th. On October 23d the free-state party framed a constitution in a convention at Topeka. This failed of approval in Congress, and in the following year the proslavery party framed a constitution in convention at Lecompton, which was rejected by popular vote. On July 5, 1859, a convention met at Wyandotte, which, with a Republican majority, framed a constitution prohibiting slavery. This was ratified by the people, October 4th, and under it the territory was admitted into the Union, July 29, 1861.

Kansas Cit'y, capital of Wyandotte Co., Kan.; at the junction of the Kaw, or Kansas, and the Missouri rivers; is bisected by the Kaw, and is separated from Kansas City, Mo., on the SE. by the line dividing Missouri from Kansas. Part of its site consists of gently rolling river bluffs, and part is low, level land adjacent to the rivers. Fourteen bridges cross the Kaw within the city limits. Seventeen railways, representing more than 50,000 m. of track, have a common terminus here or in the adjacent city. Here are situated the Kansas City Univ., the State Institution for the Blind, the College of Medicine and Surgery, and St. Margaret's and Bethany hospitals. The city is, next to Chicago, the largest livestock market in the world. Its packing plants kill upward of 4,000,000 cattle, hogs, and sheep yearly. Kansas City is the center of the Middle West's lumber traffic, about 100,000,000 cu. ft. of yellow pine being shipped annually. The yearly receipts of grain are about 73,000,000 bush. More than 4,000,000 tons of coal are sold in the city every year, twenty mining companies having their headquarters here. The trade in zinc and oil is large. The manufacture of flour and other grain products, engines, locomotives, agricultural implements and vehicles, saddles and harness, fertilizers, soap, etc., employs a capital of $27,773,422; the products have a value of $96,473,050. Kansas City was formed by the consolidation, 1886, of the former cities of Kansas City, Armourdale, and the town of Armstrong, with the larger city of Wyandotte (founded 1857). In 1903 the sudden rise of the Missouri and Kaw caused great destruction. Pop. (1906) 80,839.

Kansas City, city of Jackson Co., Mo.; at the confluence of the Missouri and Kaw rivers; opposite Kansas City, Kan.; 235 m. W. by N. of St. Louis; is built partly on a high bluff, partly on lowlands or bottoms; is connected with the Kansas shore by several fine bridges; is the centering point for thirty-nine lines of railway. There are at least sixteen public parks and a large number of public buildings, including the U. S. post office and customs house, U. S. bonded warehouses, City Hall, County Courthouse, Board of Trade building, First National Bank, Art Museum, Progress Club, Elks' Club, Y. M. C. A. building, and Public Library. Among the educational institutions are the Kansas City School of Law, nine medical colleges, Searritt Manual Training School, a college of pharmacy, two dental colleges, a school of oratory, and several commercial colleges. The stockyards here have a daily capacity of 40,000 cattle, 35,000 hogs, and 15,000 sheep; about 1,115,000 cattle and 2,900,000 hogs are slaughtered yearly by seven great establishments; the grain receipts exceed those of Chicago, being (1905) 4,038,000 bush. The city has smelting works, iron foundries, boot and shoe and furniture factories, soap and cracker factories, large flouring mills, oil, lead, and paint works, manufactories of agricultural implements and car wheels, factory system manufacturing plants (1905), 612; capital investment, $32,126,674; value of annual products, $35,573,049. Pop. (1906) 182,376.

Kansas-Nebras'ka Bill, in U. S. history, a measure passed by Congress, 1854, to organize the territory of Kansas and Nebraska. It provided that the territories "shall be received into the Union with or without slavery, as their Constitution may prescribe at the time of their admission," and that "all questions relating to slavery in the territory shall be left to the decision of the people residing therein." This principle of popular sovereignty—or "squatter" sovereignty, as its opponents termed it—roused the slumbering rancor of the slavery controversy and probably did more than anything else to hasten the outbreak of the Civil War. Among the other effects of the Kansas-Nebraska Bill was the breaking up of the Whig Party and the formation of the Republican Party on the principle of the limitation of slavery; it also practically annulled the action of the fugitive slave law in the North and lost the Democrats their hold on New England, thus contributing to their defeat in 1860.

Kansas (or Kaw) Riv'er, river in Kansas, formed by the union of the Smoky Hill and Solomon rivers; principal affluents, the Republican, Big Blue, and Grasshopper rivers from the N., and the Wakerusa from the S. Steamboats have traversed its whole course at high water, but its navigation is not of any practical value. It falls into the Missouri on the Missouri State line, at Kansas City, Kan.

Kansas, Univer'sity of, coeducational and nonsectarian institution, originating in an act of Congress of January 29, 1861, granting at Lawrence, Kan., land for the founding of a university. The Legislature of the state, on this foundation, organized the institution by act of March 1, 1864, and reorganized it 1889. As reorganized the university is divided into the departments of literature, science, and art, within which are included schools of law, pharmacy, music, fine arts, engineering, and a preparatory course of medical study. The university is under the control of a board of seven regents, six of whom are appointed by the governor and confirmed by the Senate. The university had (1907) 118 professors and instructors, 1,958 students in all departments, about 52,000 volumes in the library, scientific apparatus valued at $255,000, grounds and buildings worth $800,000, and $151,000 in productive funds.

Kant, Immanuel, 1724–1804; German philosopher; b. Königsberg, Prussia; son of a saddler of Scottish descent; was a tutor, 1746–55; a privat docent at the Univ. of Königsberg, 1755–70; Prof. of Logic and Metaphysics, 1770–97; during his whole life of eighty years never left his native city of Königsberg, except for a few miles' walk; published "Thoughts on the True Estimation of the Active Powers," 1747; "The False Hair-splitting of the Four Syllogistic Figures," 1762; "Observations on the Beautiful and Sublime," 1764; "On the Form and Principles of the Sensible, and Intelligible World," 1770. In 1781 appeared his "Critique of Pure Reason"; in 1788, "Critique of Practical Reason"; in 1790, "Critique of Judgment," the three forming one great work and not to be understood correctly except when studied in their unity. Preliminary to the "Critique of Pure Reason" is his "Prolegomena," 1783, like the other a marvel of arrangement and lucidity of style. Other works include "The Foundations of the Metaphysics of Ethics," "Metaphysical-Fundamental Principles of the Science of Nature," "Eternal Peace and Metaphysical-Fundamental Principles of a Science of Law and a Science of Morals," and "Anthropology," a book full of rare knowledge.

Kant first stated the critical or psychological point of view in philosophy as opposed to the ontological point of view which had prevailed substantially unchanged since the time of Aristotle. Kant denies that by mere reasoning we can discover any new truth or transcend the world of common consciousness. Philosophy, according to Kant, can only explain and prove truth; and its problem is to discover and apply the touchstone by which this truth can be known. Now all theoretical propositions that can be made are either identical (like A = A), and these need no proof, or synthetical (A is A and something else, too, as iron is a body, but also a magnet). But of these latter all those which are empirical can be proved only by experience; and hence pure reason is required only to prove those synthetical propositions which are not empirical—*i.e.*, which are *a priori*. When quarrels have arisen as to whether God is the *cause* of the world, or whether the soul be a *substance*, the dispute would have been settled at once if a rule had been known whereby it could have been determined whether the synthetical conception of cause could be predicated of God, or that of substance of the soul. Kant stated this rule to be that synthetic propositions *a priori* are valid only so far as it can be shown that consciousness could not otherwise be possible. Reason itself Kant explained as the Freedom, the Self-determination, or the Categorical Imperative which manifests itself in each individual as the Moral Law, the admission of which necessarily implies a Supreme God and immortality.

Kapp, Friedrich, 1824–84; German author; b. Hamm, Prussia; practiced law in Berlin for some time; removed to New York City, 1850; was a presidential elector, 1860; appointed Commissioner of Emigration, 1867; returned to Germany, 1870, and became a member of the Diet. Among his works are "The Slave Question in the United States," "History of Slavery in the United States of America," "The Trading in Soldiers of the German Princes with America," "A History of the German Migration into America," and "Frederick the Great and the United States."

Kara (kä'rä), river of N. Siberia; tributary to the Arctic Ocean, and forming in part the boundary between Europe and Asia. The Kara Sea is in the Arctic Ocean of Siberia, and lies between Nova Zembla and the mainland.

Karâchi (kä-rä'chē), or **Kurrachee**, town of Sind, India; on an inlet of the Arabian Sea, 18 m. NW. of the mouth of the Indus. Karâchi is the only seaport on these coasts, and it carries on an important trade. Pop. (1901) 116,663.

Karaites (kā'rā-īts), Jewish sect, styled by themselves BENE MIKRA, "sons of Scripture," once very important in opposition to the Rabbinites, but now insignificant. Its fundamental doctrine was that the Scripture only was the source of religious authority, while the Talmud and the rabbinical traditions were to be rejected. Its founder was Anan ben David, born of noble family, at Bazra, near Bagdad, 700 A.D. The Karaites celebrated, and still celebrate, the Pentecost on the fiftieth day counting from the Sunday of Passover week; the rabbinists, on the fiftieth day counting from the second day of the feast. Also the rite of circumcision is practiced by the Karaites in a way not recognized as valid by the rabbinic law. In respect to dietary laws, the Karaites abandoned numberless restrictions held sacred by the rabbinists. On the other hand, the Karaites aspired to the most austere purity in the social relations.

Karako'ram, old capital of the Mongol empire prior to the establishment of the court at Kambaluc (now Peking). The name occurs early in Chinese history. In 1234, when Ogdai Khan inclosed it, it became the imperial capital. It stood near the left bank of the upper course of the Orkhon, a tributary of the Selenga.

Karakoram Moun'tains. See KUEN-LUN.

Karamzin', Nikolai Mikhailovich, 1766–1826; Russian author; b. Boroditskii, Simbirsk; became, 1785, editor of *Reading for Children*, a supplement to the *Moscow Gazette*; published, 1790–93, the *Moscow Journal*; and, 1801–3, the *Messenger of Europe*; is considered to have been the creator of modern Russian prose. His works include a "History of Russia," "Letters of a Russian Traveler," "Poor Luisa," and other novels of the sickly sentimental school, and some verse.

Karens', aboriginal race of Turanian and Mongolian stock, occupying British Burma, numbering not less than 1,000,000. Oppressed by their rulers, the Burmans, they were compelled to abide in the mountainous parts of the country, where, for the most part, they still dwell. As Great Britain, however, has extended her dominions in Burma, the Karens have settled in large numbers in the lower parts of the country, and are pursuing agriculture and other useful arts. Their modern home is between the Irawadi and Menam rivers, in Central and Lower Burma. Many have found their way into Siam and into Arakan. Under the influence of Baptist missionaries from the U. S. abt. 100,000 have been Christianized.

Karls'bad. See CARLSBAD.

Kar'ma, in the Buddhist theory of transmigration, the force which controls the destiny of sentient being. The term means "action," and in this connection denotes the accumulation of merit or demerit which remains when an individual existence has come to an end by the disintegration of the five bundles of qualities, sensations, powers, and tendencies of which it is composed. This merit or demerit contains within itself an active and persistent tendency to recombine another set of qualities and powers into a new sentient being whose nature, condition, locality, and future it determines, and into which it passes. Karma is thus the force of all the actions of the particular individual existence or life just ended, and of all of the same series that have preceded it.

Karma'thians (named from HAMDAN KARMATH, one of their early leaders), Mussulman sect of reformers; originally a branch of the Ismaïlis, with whom they probably always held many doctrines in common. For a time very powerful, they terrorized Arabia, Persia, and Syria. In 930 they captured Mecca, then full of pilgrims, whom they slaughtered, desecrating the Kaaba and carrying off the Black Stone, which they kept for twenty years. Their capital was Hedjer in Haça (Bahrein), where they were still powerful in the eleventh century. The sect is not yet entirely extinct. They now reject Islam and maintain secrecy as to their religious belief.

Kar'nak, name of a village in Upper Egypt, occupying a portion of the site of ancient Thebes. The temple of Amon, commonly known as the temple of Karnak, is located on the E. side of the Nile, about 2 m. NE. of Luxor, and opposite Gurnah on the W. of the river. An avenue of sphinxes led to the water. Besides the great temple there are some twenty smaller edifices dedicated to Mut, Khonsu, Mentu, Ptah, and other deities. These ruins combine to make the most extensive collection in the world. The inscriptions found on some of the walls are of special interest to biblical scholars, since they give the names of many places in Syria and Palestine conquered by various Pharaohs.

Karnal (kŭr-näl'), city in a district of the same name; in the Delhi division of the Punjab, British India; 80 m. NNW. of Delhi, and 5 m. from the right bank of the Jamna River. It is one of the most ancient cities in India. Pop. (1901) 23,000.

Karpathian (kär-pā'thĭ-ăn) **Moun'tains**, long curvilinear range, chiefly in Austria; separates Hungary from Galicia, and Transylvania from Moldavia and Wallachia, and is nearly a semicircle, one end of which meets the Danube at Presburg and the other touches the same river at New Orsova; about 800 m. long; divisible into the E. and W. Karpathians, the latter of which extends along the N. border of Hungary. The highest points of the E. Karpathians are Negui, 8,573 ft., and the Kuhhorn, 7,303 ft. Among the W. Karpathians the Eisthalerspitze rises 8,875 ft.

Karpinski (kär-pēn'skē), **Franciszek, 1741–1825**; Polish poet, called "the Poet of the Heart"; b. Horoscow, Galicia; became secretary to Prince Adam Czartoryski, 1783, and lived at the court of King Stanislas; retired, 1791, to an estate in Lithuania which he had received from the king. His works include idyls, a tragedy, "Judyta," and a translation of Plato's "Discourses." His songs are still very popular among the Poles.

Karroo', a Hottentot word meaning hard; applied by the Boers to the steppes between the coast mountains in the SW. of Cape Colony, Africa, and the basin of the Orange River. In the dry season the surface is rough, almost as hard as a brick, and most desolate.

Kars, town and strong fortress in Russian Armenia; strategically important; on a tableland about 6,000 ft. high. It, with Ardahan, Bayezid, and Batum, formerly constituted the NE. "quadrilateral" of the Ottoman Empire. Captured by the Russians, 1828, 1855, 1877, it, together with Ardahan and Batum, was formally ceded to Russia by the Treaty of Berlin (1878). Pop. (1907) 20,805.

Karst, The, plateau of Austria; at the base of the peninsula of Istria; is remarkable for its scattered rocks, pits, caves, and subterranean streams. The most famous of the caves is that of Adelsberg.

Kashgar', capital of Chinese or E. Turkestan; in a fertile and well-watered plain, 4,043 ft. above the level of the sea; consists of two parts, an old city and a new, 5 m. apart, with the Kizil, a tributary of the Tarim, flowing between. Situated at the junction of the trade routes leading from India, China, and the valley of the Oxus, Kashgar has always been an important commercial center. Now, however, trade is mainly with Russia. It is also important strategically, and has changed hands

many times. In 1759 it was conquered by the Chinese, and held by them with short intervals until 1863, when it became the capital of Yakub Beg. In 1877 it again passed into Chinese possession. The palace of the Chinese governor of E. Turkestan stands in the new town. Pop. (1900) 100,000.

Kashkar', or **Chitral'**, Mohammedan state on the upper Chitral River; on the S. slope of the E. Hindu Kush Mountains; is now nominally a part of British India, forming its extreme N., being N. of Swat, E. of Kafiristan, S. of the Pamirs, and W. of Yassin. Pop. est. at 200,000. Kashkar is divided into two semi-independent states, the royal families of which are closely related. The states were probably founded about the middle of the seventeenth century.

Kashmir (kăsh-mēr'), formerly CASHMERE, feudatory state of British India, bordered by Chinese Turkestan, Tibet, and the Punjab; area, 80,900 sq. m.; pop. (1901) 2,905,578; capital, Kashmir or Srinagar. Kashmir consists of part of the Himalaya range of mountains, and some elevated beautiful valleys. The valley of Kashmir, 5,100 sq. m., is surrounded by the Himalayas, and at its lowest depression is 5,500 ft. above the sea. It contains several lakes, and is beautiful and fertile. The other valleys, though less extensive, are very attractive. The Himalayas have one peak at Kashmir (Panjal) 15,000 ft. high; there are several passes, of which the chief are by way of Murree along the Jhelum valley to the capital, and the more difficult one from Bhimbar across the lofty Panjal range. The Indus passes through Kashmir, and the Jhelum forms its W. boundary. Large herds of cattle and goats are pastured on the mountain slopes, and the hair or wool of the Kashmir goat is in great demand for the Kashmir shawls made here. Firearms are made in Kashmir, and precious stones are cut. Kashmir was conquered by the Emperor Akbar, 1586, and annexed to the Mogul Empire; the Afghans held possession, 1752–1819, and the Sikhs, 1819–49, when it was ceded to the British, who transferred it to their feudatory, Ghulab Singh, whose Kashmir Empire was composed of Kashmir, Baltistan, and Loday or Ladak.

Kash'mir, or **Cash'mere**, textile fabric made of the fine wool of the Tibet goat. In Kashmir the wool is received from Tibet and Tartary, and, after being bleached, is spun and dyed of various colors. The weavers, employed by the merchants for a few cents a day, receive the yarns, and in their shops, or at looms in their own houses, weave them after the patterns ordered. Each loom is estimated to produce five shawls a year; but a single one of the finest shawls sometimes occupies the work of a whole shop, keeping two to four persons constantly engaged on it for an entire year.

Katah'din, highest mountain in Maine; 5,200 ft.; 6 m. NE. of the Penobscot River; 80 m. N. by W. of Bangor; is accessible with difficulty excepting by canoes.

Ka'ter, Henry, 1777–1835; English mechanist; b. Bristol; went, 1796, to India, where he was engaged for several years on the t[illegible] metrical survey; invented abt. 1825 the [illegible] onometrical instrument called a [illegible] collimator; applied the principle of the [illegible] change of the centers of oscillation and [illegible] pension of the pendulum to the determina[illegible] of gravity; experimented on telescopes, etc. was principal author of Lardner and Kater' "Treatise on Mechanics."

Kathay'. See CATHAY.

Kath'ode, terminal of an electrolytic cell by means of which the current passes fr[illegible] th electrolyte to the metallic portions of the [illegible] cuit. The opposite electrode, that throu[illegible] which the current enters the cell, is called [illegible] anode. In electrolysis, the metal thrown [illegible] of composition by the current is always depo[illegible] ited on the kathode.

Kathode Rays, rays which are the s[illegible] of many of the most interesting and im[illegible] phenomena accompanying the electrical [illegible] charge in vacuum tubes; have been known since 1859, when Plücker observed phosphorescence on the walls of a vacuum tube, which he ascribed to rays emanating from the n[illegible] tive terminal or kathode of a highly exhausted [illegible] Hittorf, 1869, discovered that the rays c[illegible]

A CROOKES TUBE, SHOWING LUMINESCENCE OF CRYSTALS, UNDER ACTION OF KATHODE RAYS.

be intercepted by the interposition of [illegible] in their path, and that such bodies would [illegible] well-defined shadows on the walls of the tube. The name *kathode rays* is due to Goldstein, who, 1876, repeated Hittorf's experiments. The general attention of the scientific public was, however, first drawn to this subject by C[illegible] in 1878. Crookes gave to the kathode rays [illegible] name *negative rays*, because they em[illegible] from the negative terminal of the tube. [illegible] name *kathode rays* has, however, since b[illegible] universally adopted.

When a vacuum tube consisting of a c[illegible] drical tube of glass, through the closed [illegible] of which platinum wires have been in[illegible]

placed in circuit with an induction coil or influence machine, the form of the discharge between the terminals goes through a series of most interesting changes as the pressure is reduced. Such vacuum tubes are known as Crookes tubes. At ordinary pressures the spark between the terminals follows the characteristic crooked path which one always observes in the electric discharge between the poles of such a machine or coil. When the pressure has been reduced to about 160 mm. the discharge goes over into a form intermediate between the blue brush discharge and the spark. At a still lower pressure, 30 to 40 mm., it is converted into a continuous filament of ruddy color, reaching from pole to pole, which lacks the angular and abruptly broken path of the white spark in air, and which follows a nearly straight path between the terminals. With diminished pressure this red filament swells until the region between the poles has become luminous throughout.

Gradually a violet cloudlike mass makes its appearance in the neighborhood of the kathode. At a pressure between 1 and 2 mm. the luminous discharge becomes stratified transversely, while the purple mantle, which with diminishing pressures has gathered itself more and more distinctly around the kathode, becomes separated from that terminal by a dark space known as the Crookes space, and from the striated column between it and the positive terminal by a second dark space which has sometimes been called the *Faraday space*. If the exhaustion be carried further, namely, to pressures as low as a few hundredths of a millimeter, the striations undergo striking modifications: they change in color, becoming whitish rather than purple; they gradually separate one from another, becoming few in number and larger; and finally, at a pressure of about 0.01 mm., they disappear altogether. The walls of the tube now begin to show a green fluorescence produced by the kathode rays. If exhaustion be carried to a still higher point this increases for a time, until the whole surface of the glass shines, but the effect reaches a maximum, and finally, at the highest attainable vacuum, it disappears. The existence of kathode rays is recognized through the effects which they produce. The rays themselves do not affect the eye, but they are the source of a variety of striking phenomena.

The chief importance of the kathode rays lies in the fact that bodies upon which they fall are thrown into some kind of motion or action such as to make them the source from which X rays emanate. That the latter are not identical with kathode rays can be shown in a variety of ways; the two differ materially as regards their power of producing fluorescence, their behavior in the magnetic field, their chemical and photographic action, and their power of penetrating various substances. See X RAYS.

Kat'rine, Loch, lake in Scotland, in the county of Perth; 8 m. long and ¾ m. wide; remarkable as well for the depth and purity of its water as for the beautiful scenery surrounding it. Glasgow, nearly 25 m. distant, receives its water supply from this lake.

Kation (kăt'ĭ-ŏn), in electrolysis, term applied to that portion of the decomposed electrolyte which makes its appearance at the kathode. When a chemical compound is decomposed by the action of the electric current, it is always broken up into two parts, the acid radical and the metal. Of these the acid radical travels against the current and appears in nascent form at the anode, while the metallic group travels with the current and is deposited on the surface of the kathode. The latter group (the metal) is called the kation; the former, in contradistinction, is called the anion.

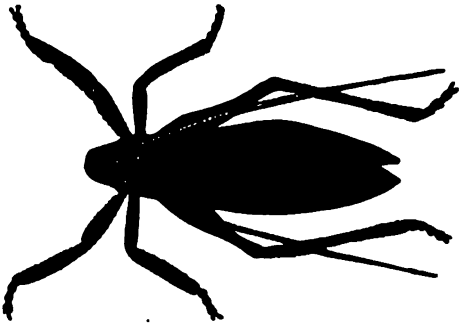
Katkoff', Michael, 1818–87; Russian journalist; b. Moscow; was for several years Prof. of Philosophy in the Univ. of Moscow; after 1856 has devoted himself exclusively to journalism, and exercised an enormous influence in a liberal direction by his denunciations of existing wrongs, and in a national direction by the formation of the Old Russian party.

Katsura (kăts-wē'ŭ), **Taro (Viscount)**, 1849– ; Japanese army officer; b. province of Choshiu; was twice sent to Germany to study its military system; became major general and Vice Minister of War; was active in the reform of the army; lieutenant general, 1891; created viscount and promoted to general for services in the Chino-Japanese War; Minister of War, 1898–1900; Premier, 1901–06, covering the period of the war with Russia; appointed to the High Military Council, 1906.

Kat'tegat. See CATTEGAT.

Kattiawar, or Kathiawar (kăt-ē-ä-wär'), great peninsula in W. India, with the Gulf of Cambay on the E. and the Gulf and Rann of Cutch on the W.; said to be divided into 188 distinct states tributary to Great Britain for the most part, but a few are yet independent; total area, 20,559 sq. m.; pop. abt. 2,500,000. Cotton is exported in great quantities. Horses of excellent breed and sheep are staple productions. The country is rich, and the residence on the soil of so many petty princes conduces to its prosperity.

Ka'tydid, large green orthopterous insect (*Cyrtophyllus concavus*) of the U. S., belong-



KATYDID.

ing to the group *Locustariæ*. It is arboreal in its habits, and is widely distributed. Its note

is produced by the friction of transparent membranes attached to the wing covers, and is heard only at night.

Kauai (kow-ä'ē), one of the Hawaiian islands; area, 640 sq. m. It is high—Waialeale, the highest point, rising about 5,000 ft.—of volcanic origin, but very fertile. Lihue, Haualei, Koloa, and Nawiliwili are the principal towns. Haeua Point contains several curious lava caves; and other attractions include the Wailua Falls and the valley of Kalihiwai. The greater part of the island is covered with sugar-cane plantations. Pop. (1900) 20,562.

Kauffmann (kowf'män), **Maria Angelica,** 1741–1807; Swiss painter; b. Coire; studied in Milan and Rome, where she painted portraits of Winckelmann and many other celebrities. In 1765 she accompanied Lady Wentworth to England, where she became a great favorite, and on the establishment of the Royal Academy she was one of the thirty-six original members. She became the wife of the Italian artist Zucchi, 1781, and returned to Rome, 1782.

Kauffmann, Constantine von, 1818–82; Russian general; b. Maidani; made himself famous by his successful expedition into central Asia; fought in the Caucasus, 1843–56; was Governor General of Turkestan, 1867; conquered Samarcand, 1868; captured Khiva, June 10, 1873. After the bloody defeats of the Russian forces, 1879, by the Turkomans, he was placed at the head of an expedition against Merv, 1880, which was equally successful.

Kaulbach (kowl'bäkh), **Wilhelm von,** 1805–74; German historical painter; b. Arolsen; officer of the Legion of Honor; grand commander of St. Michael; commander of the Order of Francis Joseph, and member of most of the art academies of Europe; went to Rome to study, 1839, though before that time he had executed decorative paintings in several public buildings in Munich; 1847, went to Berlin to decorate the hall of the new museum, a work that occupied him a number of years, and, 1849, was appointed director of the Munich Academy. Frescoes by him are at the New Pinakothek, Munich, and cartoons in the Raczynski Gallery, Berlin. Works in oil are in the museums at Nuremberg, Pesth, Stuttgart, and Munich. In the Pennsylvania Academy of Fine Arts, Philadelphia, is a "Portrait of Louis I of Bavaria."

Kaunitz (kow'nīts), **Wenzel Anton** (Prince of and Count of Rietberg), 1711–94; Austrian statesman; b. Vienna; entered the diplomatic service, 1741; by the skill with which he negotiated the Peace of Aix-la-Chapelle, 1748, and still more by his success in forming an alliance between Austria and France while ambassador in Paris (1750–52), he acquired great fame as a diplomat; and, 1753, Maria Theresa made him chancellor and placed him at the head of the Austrian Govt. This position he held for nearly forty years, and he was generally considered the greatest statesman of his age.

Kavel'in, Konstantin Dmitrievich, 1818–86; Russian author; b. St. Petersburg; studied philology and law at the Univ. of Moscow, and taught civil law there, 1844–48, after which he entered the Ministry of the Interior; became well known by his "History of the Civil Procedure and of the Organization of the Courts in Russia from the Twelfth Century to the Present Time"; by his "General Sketch of the Juridical Development of Russia before Peter the Great," and by various essays collected in an edition of his complete works. He was particularly active in the emancipation of the serfs, for which he made out a programme that was copied with little change in the great decree of 1861.

Kaye (kā), **John,** 1783–1853; English bishop; b. Hammersmith; became master of Christ's College, Cambridge, 1814; Regius Prof. of Divinity, 1816; Bishop of Bristol, 1820, and of Lincoln, 1827; wrote "The Ecclesiastical History of the Second and Third Centuries, Illustrated from the Writings of Tertullian"; "Writings and Opinions of Clement of Alexandria," "Writings and Opinions of Justin Martyr," "Government of the Church during the First Three Centuries," and other works.

Kaye, Sir John William, 1814–76; English military historian; served for some years in the army of the East India Company; returned to England, 1845; became secretary in the political and secret department of the India office; knighted, 1871; published "History of the War in Afghanistan," "History of the Administration of the East India Company," "Life and Correspondence of Lord Metcalfe," "Life of Sir John Malcolm," "Christianity in India," "History of the Sepoy War," and "Essays of an Optimist."

Kazan (kä-zän'), capital of the government of Kazan, Russia; on the Kazanska, 4 m. from its influx in the Volga; has a university with four faculties and nearly 1,000 students; a theological seminary, a military school, two gymnasia, and several other educational institutions, and forms the intellectual center of E. Russia in Europe. It manufactures leather, soap, hardware, and spirits, and its trade is very extensive; was destroyed by fire, 1815 and 1842. Pop. (1900) 143,707.

Kazbin', Kasvīn', or **Casbin',** town in province of Irak-Ajami, Persia; 90 m. NW. of Teheran; in a beautiful plain, covered with orchards and encircled by hills; manufactures velvet, silk, satin, brocade, coarse cotton fabrics, and articles of iron and brass. Its breeds of camels and horses are very celebrated. Pop. (1900) 40,000.

Kazinczy (kŏz'īn-tsē), **Ferencz,** 1759–1831; Hungarian author; b. Er-Semlyen; was inspector of schools, and devoted himself especially to the restoration of the Magyar language in its purity, and the development of its literary capabilities. Having become implicated in the democratic conspiracy of Abbot Martinovics, he was condemned to death, 1795; but his sentence was commuted, and he was imprisoned in various fortresses till 1801.

Kean (kēn), **Charles John,** 1811-68; English actor; b. Waterford, Ireland; son of Edmund Kean; made his début at Drury Lane Theater, London, 1827, in the character of *Norval*; visited the U. S., 1830; returned to England, 1833, but did not rise to the front rank of his profession till 1838; was again in the U. S., 1839-40 and 1845, with his wife (Ellen Tree); became lessee of the Princess Theater, London, 1850. He gained his chief reputation in the parts of *Hamlet*, *Macbeth*, *Richard II*, *Richard III*, and *Romeo*, but was inferior to his father.

Kean, Edmund, 1787-1833; English actor; b. London; son of a mechanic connected with the Royalty Theater and Nance Carey, an actress of little repute; was connected with strolling companies for fifteen years; made his first appearance on the London stage at Drury Lane, 1814, in the character of *Shylock*. He raised his success to the highest pitch by his impersonations of *Hamlet*, *Lear*, *Othello*, *Richard III*, *Macbeth*, *Sir Giles Overreach*, etc. He visited the U. S., 1820, and returned, 1825, but having been involved in London in a scandal and a divorce suit, he was not allowed to act in Boston and Baltimore, though he appeared in New York and Philadelphia. His health was undermined by intemperance, and in 1833 he made his last appearance, playing *Othello* to his son's *Iago*, at Covent Garden, but breaking down during the performance.

Keane, John (Lord), 1781-1844; British general; b. Belmont, Ireland; entered the army in boyhood; served in Egypt, and in Spain during the Peninsular War, gaining the rank of major general; commanded the British expedition against New Orleans, 1814, until superseded by Pakenham; was severely wounded at the battle of New Orleans.

Kear'ney, Dennis, 1847-1907; American labor agitator, b. Oakmont, Cork, Ireland; followed the sea, 1858-72; then settled in San Francisco; became foreman of a gang of stevedores; soon began to excite workingmen against capital and Chinese labor; conducted mass meetings in the "sandlots" section with the view of driving the Chinese from the state; and by his influence packed a constitutional convention and forced it to adopt a new state constitution embodying his views on labor and the Chinese; later made a lecturing tour of the principal Eastern cities, but met with scant sympathy.

Kear'ny, Lawrence, 1789-1868; American naval officer; b. Perth Amboy, N. J.; after the War of 1812-15 he cleared the W. Indies and the Gulf coast of pirates, and, 1827, sailed as commander in the ship *Warren* for the Mediterranean, where he dispersed the Greek pirates; commanded the E. India squadron, 1841-44, greatly promoting American interests in China, and was made a commodore, 1866.

Kearny, Philip, 1815-62; American military officer; b. New York City; nephew of Gen. Stephen Watts Kearny; entered the army, 1837; was sent by the government to study French cavalry tactics; entered the military school at Saumur, and served in Algeria. He was aid-de-camp to Gen. Scott, 1841-44; was made captain of dragoons, 1846; and in a charge on the San Antonio gate at the City of Mexico lost his left arm. In the Italian war of 1859 he served as a volunteer aid on the staff of the French general Maurier. On the breaking out of the Civil War he was placed in command of a brigade and afterward a division in the Union army; distinguished himself at the battles of Williamsburg, Seven Pines, and Frazier's Farm; was made a major general of volunteers, July 4, 1862; was prominent at the second battle of Bull Run; and was killed at Chantilly while reconnoitering the Confederate position alone and at night.

Kearny, Stephen Watts, 1794-1848; American military officer; b. Newark, N. J.; entered the army, 1812; became a brigadier general, 1846; in the Mexican War commanded the "Army of the West," which conquered New Mexico; was wounded in the battle of San Pascual, Cal.; subsequently commanded in the battles of San Gabriel and the Plains of Mesa, January 8 and 9, 1847; was Governor of California from March to June, 1847; published "Maneuvring of Dragoons" and "Laws for the Government of New Mexico." See STOCKTON, ROBERT FIELD.

Kearsarge (kēr'särj), **Mt.,** mountain in Carroll Co., N. H.; lat. 44° 6′ 20″ N., lon. 71° 5′ 40″ W.; height, 3,250 ft. The U. S. vessel which sunk the Confederate cruiser *Alabama*, 1864, and one of the battleships was named after another mountain of the same name in Merrimack Co., N. H., which was called by the Indians Cowissewaschook, and is 2,950 ft. high.

Kearsarge, The, a wooden corvette of 1,031 tons, launched at Portsmouth, N. H., in 1861. She was commanded by Capt. J. A. Winslow, carried 163 men, including officers, and was armed with four 23-pounders, two 11-in. rifles, and one 30-lb. rifle. On June 19, 1864, she was in battle off Cherbourg, France, with the Confederate cruiser *Alabama*. The fire from the *Kearsarge* was deliberate and destructive, and at the end of an hour the *Alabama* was totally disabled and struck her colors. In 1894 the *Kearsarge* was wrecked in the Caribbean Sea.

Keats (kēts), **John,** 1795-1821; English poet; b. London; son of a livery-stable keeper; served an apprenticeship to a surgeon, 1810-15, and then studied in London and practiced till 1817; published, 1817, a volume of poems, followed, 1818, by "Endymion," which was severely criticised by the *Quarterly Review* and in *Blackwood*. In 1820 he published a third volume, containing the odes to the "Nightingale" and the "Grecian Urn," the "Eve of St. Agnes," the unfinished epic "Hyperion," etc. Died of consumption in Rome, and was buried in the old part of the Protestant cemetery at Rome.

Ke'ble, John, 1792-1866; English poet; b. Fairford, Gloucester; was public examiner at

Oxford, 1813–16; tutor, 1818–23; Prof. of Poetry, 1831–41; was one of the original Tractarians, and a leader of the Anglo-Catholic movement; became vicar of Hursley, 1836; works include "The Christian Year," a volume of sacred poetry which attained a wide popularity on which his fame chiefly rests.

Kecskemet (kĕch'kĕm-āt), capital of the district of Pesth-Solt, Hungary; 55 m. SE. of Budapest. The rearing of cattle and horses is the chief pursuit of the inhabitants, and the annual cattle fair held in this city is the most important in the country. Pop. (1900) 57,812.

Ke'dron. See KIDRON.

Keel, in shipbuilding, the beam which passes under the ship's hull from stem to stern. It is usually made up of several heavy timbers bolted together lengthwise. The ship's ribs, stern, and sternpost spring from the keel, which is external to the hull, as the keelson is internal. Below the keel one or more false keels are bolted on. In iron vessels the keel is frequently dispensed with, and, as the whole weight of the ship and its contents exercise an oblique lateral pressure on each side of the keel line, sufficient strength is obtained, in the absence of a keel, by internal tiebeams.

Kee'ley, Leslie E., 1836–1900; American physician; b. in St. Lawrence Co., N. Y.; surgeon in the Union army during the Civil War; settled in Dwight, Ill., 1866. In 1879 he announced that he had discovered "in gold as a chloride" a cure for the alcohol and opium habits. In the spring of 1880 he opened an institute at Dwight for the cure of these diseases. A company was formed, and branch institutes, known as "Keeley Institutes," were established in various parts of the U. S.

Kee'ling, or Co'cos Is'lands, group of small low islands belonging to Great Britain; 700 m. SW. of the Straits of Sunda. There are twenty-three islands in a ring, around a central lagoon about 10 m. across in its longest diameter; total area, 8 sq. m. The islands export large quantities of copra, cocoanuts, and oil.

Kee'ly, John Worrall, 1837–98; b. Philadelphia; was by trade a carpenter; pretended to have discovered a new physical force, organized a company, 1872, and obtained a large sum for use in experiments. He invented a "hydro-pneumatic pulsating vacuo machine," the action of which was said to be produced by forces obtained from water and air; afterwards made a number of different engines, finally discarding the use of water. After his death it was discovered that his machines were operated by compressed air.

Keene, Charles Samuel, 1823–91; English illustrator and draughtsman; b. Hornsey, near London; worked for illustrated journals, and especially for *Punch* (1851–91); illustrated George Meredith's "Evan Harrington" in its serial form, Douglas Jerrold's "Mrs. Caudle's Curtain Lectures," etc. He received a gold medal for his beautiful work in black and white at the Paris Exposition, 1889.

Keene, Laura (stage name of MARY MOSS), 1820–73; English actress; b. Chelsea, London; first appeared in London, 1845; acted with success in the U. S. and in Australia; introduced at the Olympic Theater, New York, 1858, the very successful comedy "Our American Cousin." It was at one of her representations of this play that Pres. Lincoln was assassinated.

Keewatin (kē-wä'tĭn), **district of Canada,** bordering on the provinces of Ontario, Manitoba, and Saskatchewan, and Hudson Bay; extending to the Arctic Ocean, and including Boothia and Melville peninsulas; created, 1876; enlarged, 1883; area, 470,416, sq. m.; water surface, 13,419 sq. m.; under administrative jurisdiction of the Lieutenant Governor of Manitoba. It has vast forests of good timber and large deposits of iron ore and other minerals, but the latter have never been developed; the fisheries are capable of producing much wealth; population is chiefly Indian, and widely scattered.

Keighley, or **Keithley** (kēth'lē), market town of the W. Riding of Yorkshire, England; 9 m. NW. of Bradford; has water communication with the E. and the W. coasts by the Liverpool-Hull Canal; owes its importance to the development of its manufacturing industry, worsted and woolen goods, machinery, machine tools, sewing machines, etc. Pop. (1901) 41,564.

Kei (kā) **Is'lands,** group of islands in the Malay Archipelago, S. of New Guinea. Great Kei comprises an area of 294 sq. m., Little Kei of 283 sq. m. They are rich in timber, cocoanuts, tortoise shells, sago, and different fruits.

Keim (kīm), **Karl Theodor,** 1825–78; German theologian; b. Stuttgart. After studying at Tübingen and Bonn, and holding a pastorate at Esslingen, Würtemberg, 1856–60, he became Prof. of Theology in Zurich, and later, 1873, in Giessen. He was a remarkable scholar, and produced the standard life of Jesus from the rationalistic standpoint.

Kei (kā) **Riv'er, Great,** stream which separates the formerly so-called British Kaffraria, now a part of the Cape Colony, from Kaffraria proper. It empties into the Indian Ocean. Like all rivers of Kaffraria, it is unfit for navigation.

Keith (kēth), **George,** 1638–1716; British clergyman; b. Aberdeen, Scotland; was educated for the Presbyterian ministry, but adopted Quaker principles abt. 1664, and accompanied William Penn and others to Holland, 1677, to disseminate their tenets; emigrated to America, 1684, and became surveyor general of E. Jersey; took charge of a Quaker school in Philadelphia, 1689. He became involved in a controversy with his own sect, and founded another known as Keithians, Christian Quakers, or Baptist Quakers, but ultimately entered the Church of England and was employed as a missionary by the Society for Propagating the Gospel in Foreign Parts. Returning to Eng-

land, 1704, he was appointed rector of Edburton, Sussex.

Keith, George Keith-Elphinstone (Viscount), 1746–1823; British admiral; b. Elphinstone, Scotland; was commissioned post captain, 1775, and, in command of the frigate *Perseus*, participated in the British attack on Bunker Hill, and in the capture of Fort Mifflin on the Delaware, 1777. In 1793 he served under Lord Hood at Toulon; 1795, as rear admiral, took possession of Cape Town; and subsequently conquered Ceylon, Cochin, Malacca, and the Moluccas. In August, 1796, he captured a Dutch squadron off Saldanha Bay. In March, 1800, he blockaded Genoa; subsequently coöperated with Abercrombie in the military operations in Egypt; and, 1815, commanded the Channel fleet which prevented the escape of Napoleon I and brought about his surrender.

Ke'lat. See KHELAT.

Kel'ler, Helen Adams, 1880– ; b. Tuscumbia, Ala.; daughter of Arthur H. Keller, who had been an officer in the Confederate army. An attack of scarlet fever, when she was nineteen months old, left her blind and deaf, and the few words she had acquired soon left her, so that she was practically dumb. In her seventh year she was placed under the care of Miss Anne M. Sullivan, a teacher from the Perkins Institute for the Blind in Boston, from whom she acquired the sign language, learned the alphabet, and acquired the ability to read a connected story. In 1890 she was taught to speak articulately by Miss Sarah Fuller, of the Horace Mann School. Later she prepared for Radcliffe College, Cambridge, Mass., under Miss Sullivan's guidance, entered that institution, 1900, and graduated with high honor. She speaks French and German as well as English, and uses a typewriter in her correspondence and literary work. Miss Keller is a vice president of the New York State Institution for Promoting the Instruction for the Blind. In addition to magazine articles, she has published "The Story of My Life."

Kel'lerman, François Christophe (Duke de Valmy), 1735–1820; b. Alsace. He entered the French army, and when the revolution broke out he became an ardent supporter of the revolutionary cause. He rendered important services to the republic, yet was imprisoned for a time on allegation of treason. He became a marshal and a duke in the empire, and commanded the reserves on the Rhine during the campaigns of 1809 and 1812. At the restoration he became a royalist.

Kelp, brown seaweeds of the family *Laminariaceæ*, common along the seacoast. Many of the species are of large size, ranging from 6 to 10 ft., in the "devil's apron" of the Atlantic coast of N. America, to several hundred feet, in the giant kelp of the Pacific Ocean. In the S. hemisphere they form dense submarine forests of gigantic size, making even deep water impassable for boats, and forming a home for myriads of marine animals. The kelps are of importance as a source of iodine. Some species are used as food in N. countries; the hard dried stems of others are made into

KELP.

canes, etc., and the great masses thrown ashore by storms are used as a fertilizer.

Kel'vin (Lord). See THOMSON, SIR WILLIAM.

Kem'ble, name of a family of British actors, the most important of whom follow: JOHN PHILIP (1757–1823), made his first appearance January 8, 1776. In 1783 he first acted at Drury Lane; 1803, became manager and part owner of Covent Garden Theater, burned 1808; opening of the new theater, 1809, under his management led to the O. P. ("old price") riots, excited by the increased prices required for admission; retired, 1817; in the personation of *Cato*, *Coriolanus*, *King John*, *Wolsey*, *Macbeth*, and *Lear*, he had no rival among contemporaneous actors. CHARLES (1775–1854), made his first appearance at Drury Lane, 1794; was accounted one of the best genteel comedians of his time, excelling in such parts as *Benedick*, *Petruchio*, *Archer*, *Ranger*, *Charles Surface*, etc.; 1832, made a tour in the U. S. with his daughter Fanny; 1840, closed his career as an actor, and soon after was appointed examiner of plays in England.

FRANCES (Mrs. BUTLER, 1809–93), best known as Fanny Kemble, daughter of the preceding; made her début at Covent Garden, under the management of her father, 1829; for the three succeeding years distinguished herself in *Juliet*, *Portia*, *Bianca* in "Fazio," *Julia* in "The Hunchback," *Belvidera*, *Isabella*, *Lady Teazle*, and *Louise de Savoy* in her own play of "Francis the First," written when she was seventeen years old; 1834, married Pierce Butler, of Philadelphia, from whom she was divorced, 1849; published "A Journal of a Residence in America," a drama entitled "The Star of Seville," a collection of her poems,

"A Year of Consolation," "Residence on a Georgia Plantation in 1838–39," and "Old Woman's Gossip"; after 1848 she gave Shakespearian readings in the U. S. and Great Britain.

Kemble, John Mitchell, 1807–57; Anglo-Saxon scholar; oldest son of Charles Kemble; b. London; devoted himself to the study of the earliest Teutonic dialects, and published, 1833, "The Anglo-Saxon Poems of Beowulf," with a glossary and translation; edited *The British* and *Foreign Quarterly Review*, 1835–44; published "Codex Diplomaticus Ævi Saxonici," and "The Saxons in England," his best known work.

Kem'pelen, Wolfgang (Baron von), 1734–1804; Hungarian mechanician; was the inventor of a so-called automaton chess player, made for the amusement of the Empress Maria Theresa (1769), which was exhibited in Paris, 1784, and afterwards in Great Britain and the U. S. It was an ingenious contrivance for concealing a living player. He also invented, 1778, an automaton speaking human figure, which he explained in "Le mécanisme de la parole." He filled several political posts at the Austrian court, and published poems and dramatic pieces.

Kem'per, Reuben, d. 1826; American soldier; b. Virginia; settled in the Territory of Mississippi; sought to rid W. Florida of its Spanish rule, and subsequently devoted himself to the task of driving the Spaniards from the American continent. He was engaged in an unsuccessful attempt to capture Mobile and in the expedition of Gutierrez and Toledo, 1812, against the Spanish authority in Mexico, and was colonel of the force, 500 or 600 in number, which coöperated with the Mexican insurgents. The expedition advanced into Texas and fought several battles, but disagreed with their allies and returned home. Kemper was engaged under Jackson in the defense of New Orleans.

Kem'pis, Thomas à, 1380–1471; German ascetic writer; b. near Cologne; began his noviceship at the monastery of Mount St. Agnes, 1400, and, 1413, was ordained priest; 1425, was elected subprior of the monastery, and was charged with the spiritual direction of the novices. He owes his world-wide fame to the book entitled "De Imitatione Christi," which has been many times translated into every civilized language. Its authorship has been ascribed to Jean Gerson, chancellor of the Univ. of Paris, and to Gersen or Gesen, an Italian abbot. The external evidences in favor of à Kempis are the facts that he is mentioned as the author by three writers nearly his contemporaries, that copies exist written in his own hand, and that in one ancient copy he is declared to be the author.

Kenai (kēn'ī), peninsula on the S. coast of Alaska; between Cook's Inlet and Prince William's Sound; coast is much indented; Day's Harbor and Resurrection Bay afford good anchorage; interior little known; mountainous and infertile; glaciers said to occupy some of the valleys.

Ken'dal, William Hunter, 1843– ; English actor; b. London; family name Grimston; entered the dramatic profession, 1861; member of the company of the Theater Royal, 1862–66; appeared in London in "A Dangerous Friend," and his talent met with gratifying recognition; subsequently played *Orlando* in a revival of "As You Like It," and took such parts as *Captain Absolute* and *Charles Surface*; also played in Gilbert's most successful pieces, "The Palace of Truth" and "Pygmalion and Galatea." In 1869 he was married to Madge (Margaret) Robertson (b. Great Grimsby, 1848), and as Mr. and Mrs. Kendal they afterwards acted in the same companies and made several successful tours in the U. S.

Ken'ilworth, town in Warwickshire, England; contains ruins of Kenilworth Castle, which became notable in the history of Queen Elizabeth on account of the gorgeous manner in which the Earl of Leicester entertained her here for seventeen days. See Sir Walter Scott's "Kenilworth."

Ken'ites, nomadic people between Sinai and Palestine, first mentioned in Gen. xv, 19, and numerous times later, and always as having friendly relations with the Chosen People. They inhabited the desert lying between S. Palestine and the Sinai Mountains, and roamed over this region and along the E. coast of the Gulf of Akabah. Jethro, the father-in-law of Moses, is called a Midianite in Ex. iii, 1 and Num. x, 29, and a Kenite in Judg. i, 16. Many of the Kenites accompanied the Israelites in their desert march and entered with them into the Promised Land, but retained their nomadic habits.

Kennebec' Riv'er, stream which rises in Moosehead Lake, Me., although its principal head stream, the Moose River, rises more than 50 m. W. of that lake, of which it is a tributary. The river falls some 1,000 ft. in 100 m., reaching tide water at Augusta, where it is crossed by a large dam, affording great water power. Seagoing steamboats and coasting vessels ascend to Gardiner, except in winter, when navigation ceases entirely. The river is navigable for ships to Bath, 12 m. Its banks are fertile and beautiful, and are the seat of a large trade in lumber, provisions, hay, cattle, etc. The Androscoggin River is the largest tributary of the Kennebec, joining it at Merrymeeting Bay, 18 m. from the ocean.

Ken'rick, Francis Patrick, 1797–1863; American Roman Catholic prelate; b. Dublin, Ireland; became principal of the ecclesiastical seminary at Bardstown, Ky., 1821; coadjutor to Bishop Conwell, of Philadelphia, 1830, and his successor, 1842. In Philadelphia he founded the Theological Seminary of St. Charles Borromeo. He was appointed archbishop of Baltimore, 1851; presided as apostolic delegate over the first Plenary Council the U. S., 1852, and, 1859, received for his see the "primacy of honor" in the U. S. His numerous theological works are regarded as classical in the U. S., and used as text-books in seminaries. At the time of his death he was engaged on a revised English translation of the Bible, with

copious notes, and had published the whole of the New Testament and the greater part of the Old.

Kent, Edward Augustus (Duke of), 1767–1820; fourth son of King George III of England; joined the army; participated in the capture of some of the French W. India islands; was appointed governor of Nova Scotia and commander in chief of the British forces in N. America. The island of St. John changed its name to Prince Edward in his honor. On his return to Europe he married (May 20, 1818) a German princess, Maria Louisa Victoria (1786–1861), widow of the Prince of Leiningen, daughter of the Duke of Saxe-Coburg. From this marriage Queen Victoria was born, 1819.

Kent, James, 1763–1847; American jurist; b. Philippi, N. Y.; became judge of the Supreme Court of New York, 1798; was its chief justice, 1804–14; chancellor of the state, 1814–23; Prof. of Law in Columbia College; was one of the fathers of American jurisprudence; chief work, "Commentaries on American Law."

Kent, William, abt. 1685–1748; father of English landscape gardening; b. Yorkshire; was apprenticed to a coach painter, and showed so much talent that he was enabled by the help of patrons to study art at Rome. In 1716 he was invited by the Earl of Burlington to return to England as his guest, and resided with that nobleman for the remainder of his life. He was in some demand as a painter, sculptor, and architect, but his real importance was as the founder of landscape gardening in England, the best specimen of the new principles of taste being Kensington Gardens.

Kent Is'land, largest island in Chesapeake Bay, belongs to Queen Anne Co., Md.; 15 m. long, and very fertile, has important oyster fisheries; is the site of the earliest settlement in the state, was colonized, 1631, by William Clayborne.

Ken'ton, Simon, 1755–1836; American pioneer; b. Fauquier Co., Va. At sixteen had an affray arising from a love affair, and believing he had killed his adversary, fled beyond the Alleghanies, and became a companion of Daniel Boone, whose life he saved in a conflict with Indians. He accompanied George Rogers Clark on his expedition to Kaskaskia, 1778. He showed great courage and sagacity in obtaining information as to the Indians' movements, was a major under Gen. Anthony Wayne, 1793–94, brigadier general of Ohio militia, 1805, and fought at the battle of the Thames, 1816. As Kentucky filled with settlers, Kenton was reduced to poverty, for his immense tracts of land were lost through his ignorance of law. But after 1824 his lands were released and a pension of $240 a year was procured for him from Congress. He died near the spot where, fifty-eight years before, he had narrowly escaped death at the hands of the Indians.

Kentuck'y (name derived from the Iroquois Indian *Kentake*, meaning prairie or meadow land, in allusion to the treeless tract in the S. central part of the state), popular names, BLUE-GRASS STATE, CORN-CRACKER STATE; state flower, golden-rod; state in the S. central division of the N. American union; bounded N. by Illinois, Indiana, and Ohio, from which it is separated by the Ohio River; NE. by W. Virginia, SE. by Virginia, S. by Virginia and Tennessee, W. by Missouri and Arkansas, from which it is separated by the Mississippi River; area, 40,400 sq. m.; estimated pop. (1906) 2,320,298, including abt. 285,000 negroes; capital Frankfort; principal cities and towns: Louisville, Covington, Newport, Lexington, Paducah, Owensboro, Henderson, Bowling Green, Hopkinsville, Ashland, Maysville, Bellevue, Dayton, Winchester, Richmond, Paris, Danville, Middlesboro.

The surface, with the exception of about 2,000,000 acres of high land in the mountains, and 500,000 acres of low lands in the river bottoms, is a plateau, gently sloping from the

mountains on the E. to the rivers on the W. and NW.; average elevation above the sea, 800 ft.; principal mountain area in the SE., where are Cumberland Mountain and Pine Mountain, and some peaks 2,500 ft. above the Cumberland River valley. Besides the Mississippi, the Ohio, and the Big Sandy rivers, which lie on its borders, there are five internal rivers, the Licking, Kentucky, Salt, Green, and Cumberland, all navigable. The Tennessee rises within a mile of the source of the Cumberland, but runs most of its course in Tennessee and Alabama, then enters Kentucky near the Cumberland, and runs parallel with it to the Ohio. There is one canal, at Louisville, which enables loaded vessels to pass around the falls of the Ohio without breaking bulk.

In the E. central part of the state is the far-famed "blue-grass" region; adjoining it partly, a tract misnamed "the barrens" by the early settlers from its treeless character. The soil is very fertile in the "blue-grass" region and on the river bottoms. The climate is not subject to the extremes common to other states in the same locality. The temperature seldom exceeds 100° F. in summer, or falls below zero in winter. Rain falls abundantly in winter and spring. In the mountain region of E. Kentucky is an area of some 12,000 sq. m., where bituminous, block, and cannel coals are

found, and in the W., bordering on Illinois and Indiana, is an area of about 4,000 sq. m., yielding block and cannel coals. From the Ohio to the Cumberland extends a tract of blue limestone. The coal fields contain extensive beds of iron ore and quarries of stone of large variety. Among other products are fire clay, molding sand, potter's clay, glass sand, sulphur, lead, niter, fluorspar, asphaltum, petroleum, and natural gas. Salt, sulphur, saline, and chalybeate springs are numerous. In the Green River region are numerous caverns, including the Mammoth Cave. The total value of the mineral products (1907) was $19,294,-341, including coal, $11,405,038; fluorspar, $133,911; clay products, $2,611,364; stone, $1,-002,450.

The principal farm crops, 1906, were: Corn, 105,437,376 bushels, valued at $44,283,698; winter wheat, 11,542,598, $8,426,097; oats, 4,-430,354, $1,683,535; rye, 162,260, $113,582; potatoes, 2,848,352;, $1,737,495; hay, 603,723 tons, $7,999,330; and tobacco, 252,300,000 lbs., $19,427,100—total value, $83,670,837. The live stock (1907) comprised 387,327 horses, valued at $37,679,162; 198,850 mules, $21,628,-928; 402,000 milch cows, $11,256,000; 736,250 other cattle, $12,972,716; 1,060,000 sheep, $4,-478,500; and 1,213,380 swine, $7,280,280—total value, $95,295,586. According to the U. S. census of 1905, Kentucky had 3,734 factory-system manufacturing plants, operated on a capital of $147,282,478, and yielding annual products valued at $159,753,968. The principal manufactures were flour, foundry and machine-shop products, tobacco and cigars, whisky, malt liquors, iron and steel, jeans, leather, carriages and wagons, hydraulic cement, furniture, agricultural implements, lumber, saddlery and harness, woolen and cotton goods, bagging and rope, and salt (chiefly by evaporation).

The leading educational institutions are Kentucky Univ. (Christian), founded, 1798, as Transylvania Univ., Lexington; State Agricultural College, Lexington; Central Univ. (Presbyterian), Danville; Bethel College (Baptist), Russellville; Union College (Methodist Episcopal), Barbourville; State Univ. of Kentucky (Baptist), Louisville; Georgetown College (Baptist), Georgetown; Berea College (nonsectarian), for white and colored, Berea; St. Mary's College (Roman Catholic), St. Mary's; and normal schools at Bowling Green, Madisonville, Corinth, etc. The principal religious bodies are the Baptist, Roman Catholic, Methodist Episcopal South, Disciples of Christ, Methodist Episcopal, and Presbyterian. There are institutions for the blind and the deaf and dumb in Louisville and Danville; asylums for the insane in Anchorage, Lexington, and Hopkinsville; a house of refuge in Louisville; a large penitentiary in Frankfort and a branch in Eddyville.

Daniel Boone and others made explorations in the region, 1769; permanent settlements were established by Boone, James Harrod, and Benjamin Logan, 1775; the Transylvania Company purchased the greater part of Kentucky from the Cherokees, and numbers of colonists entered. In 1776 the Virginia Legislature erected this purchase into the county of Transylvania, and, 1783, formed Kentucky into one district. Conflicts between the colonists and the Indians caused Kentucky to be called "the dark and bloody ground," and the foes were not quelled till 1794, when Gen. Wayne won the battle of Fallen Timbers. Attempts to separate Kentucky from Virginia failed until 1790, when the mother state consented, and on June 1, 1792, Kentucky entered the Union. At the beginning of the Civil War the state took a neutral position, but 80,000 of her citizens entered the Union army, and 4,000 the Confederate. Federal and Confederate forces entered, and during the latter part of 1861 numerous skirmishes and unimportant engagements occurred. In November a convention assembled at Russellville, then within the Confederate lines, organized a provisional government, and, 1862, an attempt was made to inaugurate it at the capital, which the advance of Union troops prevented. At Mill Spring, January 19, 1862, Gen. George H. Thomas defeated the Confederate forces, and after the fall of forts Henry and Donelson in Tennessee, the Confederates withdrew from the state, but returned under Gen. Bragg in September, only to be defeated at Perryville, and to again withdraw. The state continued to be disturbed by raids, and martial law was declared by Pres. Lincoln, 1864. The civil authority was restored by Pres. Johnson, October 18, 1865. During the crisis growing out of the contested election of 1899, William Goebel, the governor elect, so claimed by the Democratic Party, was assassinated, January 30, 1900.

Kentucky, river of Kentucky which rises in the mountains of Letcher Co., flows in a tortuous NW. course some 250 m., reaching the Ohio at Carrollton. Its head streams flow through a rough region abounding in iron, coal, and salt. Great amounts of money have been expended in improving the navigation of this beautiful stream, which steamboats now ascend to Frankfort, 60 m., and flatboats for 150 m.

Kentucky and Virgin'ia Resolu'tions, in U. S. political history, two series of resolutions passed by the legislatures of Kentucky and Virginia in 1798 and 1799. The Kentucky resolutions were drafted by Thomas Jefferson, and asserted that "the several states being sovereign and independent have the unquestionable right to judge of the infractions of the Constitution, and that a nullification by those sovereignties of all unauthorized acts done under color of that instrument is the rightful remedy." Similar resolutions were passed by the Virginia Legislature. This extreme state's-rights doctrine was communicated to the legislatures of the other states, but was generally disapproved.

Ke'okuk, city in Lee Co., Iowa; on the Mississippi River near its confluence with the Des Moines; 46 m. S. of Burlington; is at the foot of the lower rapids, 12 m. long, with a fall of 24 ft., around which the U. S. Govt. has constructed a ship canal at a cost of $8,-000,000. The city is built on limestone bluffs 150 ft. high, overlooking the river, here crossed

by a railway and highway bridge 2,300 ft. long; is the center of a rich agricultural, fruit-growing, and stock-raising region, and is distinctively a jobbing and manufacturing city, with direct steamboat communication with St. Louis, St. Paul, and other large cities. It contains the Keokuk Medical College, Keokuk Dental College, College of Physicians and Surgeons, St. Vincent's Academy and St. Peter's Boys' School (both Roman Catholic), Home for the Friendless, Mercy and St. Joseph's hospitals, U. S. Govt. building, and a National Soldiers' Cemetery. Pop. (1900) abt. 15,000.

Kep'ler, Johann, 1571–1630; German astronomer; b. Würtemberg; studied astronomy under Möstlin, a disciple of Copernicus; 1594, became Prof. of Mathematics in the Univ. of Gratz; published an almanac for 1595, and, 1596, his "Cosmographical Mystery," containing a fanciful theory of the order of the heavenly bodies. He next accepted Tycho Brahe's invitation to go to Prague and assist him in the preparation of a new set of astronomical tables, which the Emperor Rudolph II intended to substitute for those calculated on the Ptolemaic and Copernican systems. Tycho shortly afterwards died, and Kepler succeeded him as principal mathematician. In his optical treatise, "A Supplement to Vitellio," published 1604, he was singularly successful in analyzing the structure of the eye. In this work he also described the mode of calculating eclipses which obtains at the present day. In his work on optics, entitled "Dioptrics" (1611), he described the astronomical telescope, having two convex lenses, by which objects are seen inverted. These discoveries, however, are obscured by the greatness of those announced in his "New Astronomy, or Commentaries on the Motions of Mars" (1609), which constitute the first two of the three great laws of planetary motion known as Kepler's laws, namely, the ellipticity of the planetary orbits, and the fact that the radius vector of every planet passes over equal areas in equal times. Between 1618 and 1622 appeared the seven books of his "Epitome of the Copernican Astronomy," which was placed by the Inquisition on the list of prohibited books; and, 1619, he published his "Harmonies of the World," memorable as containing the third of his celebrated laws, viz., that the squares of the periodic times of the planets are proportional to the cubes of their mean distances from the sun. The Rudolphine tables were published, 1627. In 1629 he removed to Sagan in Silesia, and soon afterwards secured a professorship in the Univ. of Rostock. In 1630 he went to Ratisbon, and made another fruitless effort to obtain from the imperial assembly his arrears, which amounted to 8,000 crowns. Vexation, combined with fatigue, brought on a fever which proved fatal. Between 1594 and 1630 he published thirty-three works, besides leaving twenty two volumes of manuscripts.

Keram'ics, or **Ceram'ics,** art of making objects of clay or some natural earth, or in the case of soft porcelain of an artificial mixture of earths and minerals, which vessels are made solid and durable by exposing them to a great heat; also the objects themselves, taken collectively; also the study of the art and of its history. In each of these senses the term covers and includes a number of rather general terms, such as earthenware, pottery, stoneware, porcelain, as well as many names of separate and distinct kinds of ware. Nearly all the famous wares which play so important a part in the history of the decorative arts are included under earthenware. Thus the famous Greek painted vases are either of terra-cotta or of a softer earthenware with a surface very slightly glazed or enameled. Nearly all the splendid ornamental wares of the sixteenth and seventeenth centuries belong to the class of enameled pottery; thus majolica, the enameled terra-cotta called Della Robbia from the great artists who used it for their important compositions, Palissy ware, Dutch decorative pottery or delft, and the many kinds of French ware, as Moustiers, Rouen, Nevers, etc., are all varieties of faïence.

All the above-named wares, and all kinds of earthenware as here considered, have a porous paste. If a broken edge is touched to the tongue, the tongue seems to cling to it, as it takes up the moisture very rapidly; but in stoneware, the next great division, the paste is not porous, it is partly vitrified throughout its whole mass, and is much more compact. It is stoneware that is used for vinegar jugs and pickle jars and German beer mugs. The most ornamental kind of stoneware is that known as *grès-de-Flandres*, or Flemish ware, and also as Cologne ware; it is gray in color, hard and smooth, mottled, and decorated with blue; its peculiar ornamentation is by means of patterns in low relief, made by stamps, and also by the very quaint and peculiar shapes given to the vessels made of it. This ware has generally a very thin glaze, made either by the further vitrification of the surface in the heat of the oven, or by means of common salt. The peculiarity of porcelain is its translucency. Chinese and Japanese porcelain had been imported into Europe for many years before any serious attempt was made in Europe to produce a similar ware. The various experiments tried in the seventeenth century resulted in what is called soft or tender porcelain, which is indeed hardly a keramic ware at all, as it is composed of many different ingredients and scarcely at all of natural clay or other earth. At length a porcelain clay was found in Europe, and the hard porcelain of Sèvres, Vienna, and Berlin began to be made at the national factories of those cities toward the close of the eighteenth century. See also POTTERY AND PORCELAIN.

Kerbela (kĕr-bā'lä), or **Meshed-Hossein** (mĕsh-ĕd'-hŏs-sān'), city of Asiatic Turkey; in the vilayet of Mesopotamia; 50 m. SW. of Bagdad; has five gates, an extensive and well-supplied bazaar, and many khans. Hossein, the most revered martyr of the Shiite Mussulmans, son of the Caliph Ali and of the prophet's daughter Fatima, was massacred here, 680. His magnificent tomb is annually visited by about 200,000 pilgrims. Pop. (1900) 65,000.

Kerguelen (kĕrg'ĕ-lĕn) **Is'land** (named from its discoverer, Ives Joseph de Kerguelen-

Tremarac (1745–97), island in the Indian Ocean, 100 m. long and 50 m. broad; has many bays, inlets, and surrounding islets; is barren, covered with moss, and has but a few flowering plants, the most important of which is the so-called Kerguelen's Land cabbage, which is antiscorbutic, and valued as food by mariners. Kerguelen was appropriated by France, 1893.

Kermân', capital of the province of Kerman, Persia. In the eighteenth century it was very flourishing. Its manufactures of shawls and carpets are still celebrated, and it has some importance as a fortress. Pop. (1900) 60,000.

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Kes'trel, one of the smallest and most abundant of European hawks, the *Falco tinnunculus*, called also "windhover," from its habit of maintaining itself in one place in the air,

KESTREL.

with its head to the wind. It is a great devourer of mice and other vermin.

Ke'tone. See ACETONE.

Ket'teler, Wilhelm Emanuel (Baron von), 1811–77; German prelate; b. Münster; studied law; was in the civil service; became a priest, 1844; Bishop of Mentz, 1850. The restoration of the Roman Catholic Church to its mediæval power and splendor was the grand idea of his life, and for that idea he fought with courage and perseverance. At the Council of the Vatican he voted with the minority, and even left Rome before the council was closed. When the dogma of the infallibility of the pope was promulgated, Ketteler immediately and unconditionally submitted. In 1871 he was elected to the first German Reichstag, and became the ablest ultramontane leader in that body.

Kew (kū), village of Surrey, England; on the Thames; 7 m. SW. of St. Paul's, London; famous for the Royal Botanic Gardens, the richest in the world. There are 248 acres in the grounds, of which seventy are in the botanic gardens proper, the remainder being the arboretum. Students are admitted at any time, and the public every afternoon.

Ke'weenaw Se'ries, in American geology, a great group of rocks of Algonkian age. They consist chiefly of sandstones, conglomerates, amygdaloids, and traps, the last two being eruptive rocks. The total thickness reaches a maximum of about 40,000 ft. The beds have been bent into a huge trough which holds the W. end of Lake Superior, outcropping on both shores and constituting Isle Royal. In Michigan a broad belt follows the lake shore from Keweenaw Point to the state boundary, beyond which it covers a large area in N. Wisconsin. In Minnesota the rocks occupy the coast from Duluth to Grand Portage Bay, and in Canada they constitute the islands and peninsulas near Thunder, Black, and Nipigon bays. They com-

tain the celebrated copper deposits of the Lake Superior region.

Kew Magnetom'eter, portable instrument for the determination of the horizontal force of the earth's magnetism. It was devised for the use of the magnetic observatory at Kew, England, for which it takes its name. It is in general use among civil engineers for the determination of the elements of the magnetic field of the earth.

Key, Francis Scott, 1779–1843; American poet; b. Frederick Co., Md.; practiced law in Frederick, Md., and Washington, D. C.; was district attorney for the District of Columbia for many years; is chiefly remembered as the author of "The Star-spangled Banner," which he composed while he was a prisoner in the British fleet during the bombardment of Fort McHenry, 1814. James Lick left $60,000 for a monument to Key, which was erected in Golden Gate Park, San Francisco, Cal.

Key, in modern music, the scale in which every regular composition is written, or purports to be written. The first or root note of that scale, from which all its steps or degrees are reckoned and derive their character, is called the *keynote* or tonic. These scales or keys are either major or minor, no other "modes" being recognized in what is distinctively known as modern music. The normal form of a scale in the *major* mode is that of C; and the scale of A gives the normal form of the *minor* mode; but under certain conditions scales similar to those of C and A may take their rise from *any* point or degree of the diatonic-chromatic scale, as there are twelve degrees in the original scale (*viz.*, C), the number of possible scales will be twelve in the major mode and twelve in the minor. The composer has therefore a choice of twenty-four keys, differing both in acuteness and in certain peculiarities of expression. It will be found that each of those additional scales is imperfect in its natural order of tones and semitones, differing more or less in form from the pattern scales of C and A, and therefore requiring an adjustment of certain intervals to render it fit for use. To find the tonic or *keynote* of any piece or movement, it is ordinarily sufficient to refer to the *last note in the bass* (which is almost always the tonic), and then to ascertain from the *signature* whether the key is major or minor. Should the final bass note, for instance, be C, and no sharps or flats be found at the clef, the key is that of C *major*; but, if we find three flats at the clef, we know from this signature that the key is C *minor*.

Key'note. See KEY.

Key'stone State, Pennsylvania, because it was the seventh, or central, state of the original thirteen.

Key West, capital of Monroe Co., Fla.; on the island of Key West, at the entrance to the Gulf of Mexico; 110 m. N. by E. of Havana; 430 m. S. by E. of Tallahassee. The island is the extreme S. boundary of the U. S., and the city the most southerly one in the country. The island is of coral formation; 7 m. long and from 1 to 2 m. broad; has a general elevation of only 11 ft. above sea level; and is covered with a thin layer of soil of extreme fertility. The city is a port of entry and, by reason of its connection with the Gulf of Mexico, an important naval station, and is protected by Fort Taylor, a casemated fortification on an artificial island within its harbor. There are two lighthouses on the island, one within the city, and the latter has direct steamship communication with New York and New Orleans. The principal industries are cigar making, sponging, fishing, and wrecking, and a considerable business is done in fancy turtle and other shell work. Pop. (1906) 21,174.

Khabur', river in the vilayet of Mesopotamia, Asiatic Turkey; after a N. to S. course of over 200 m., it empties into the Euphrates at Kerkesieh. The attempt of biblical scholars to identify this river with the Chebar, on the banks of which the captive Israelites were located, is probably not justified, that river being farther S. in "the land of the Chaldeans."

Khaf'ra, fourth (according to Manetho, the third) king of the fourth Egyptian dynasty; builder of the second largest pyramid of Gizeh. The construction of the great Sphinx has also been credited to him, but monumental evidence carries it back to the time of Cheops (Khufu), the second king of the same dynasty, to whom restorations of the image are ascribed.

Khairpur (khīr-pōr'), feudatory Mohammedan state of Sind, British India, and its capital. The country is arid except along the Indus and its derivative, the E. Narra, but wheat and indigo are raised between these two streams. The inhabitants are mostly Jats. Pop. (1901) 199,313. The capital is 15 m. from the left bank of the Indus, is a dirty city, now in decadence, in a marshy plain; gold ornaments, embroideries, and arms are manufactured.

Khalid (khā'lĕd), 582–642 A.D.; Mussulman general; b. Mecca; as commander of the Koreish cavalry, defeated the Prophet Mohammed at the battle of Ohud, 623; was converted to Islam, 629; in the same year gained the desperate battle of Muta, and received from the prophet the title of "the Sword of God"; subdued the revolted Arabs, 632; conquered Irak and Arabi, 633; captured Bosrah, 634; gained over the generals of the Emperor Heraclius I the battles of Aiznadin, 634, and Yermouk, 636; was hated by the Caliph Omar and died in disgrace at Emesa, Syria.

Khalkas', those tribes of Mongols who occupy the steppes of N. Mongolia, and who were the last to acknowledge the supremacy of the Manchu dynasty which now rules in China.

Khan (khän), title of Tartar and Mongol sovereigns and magnates. As now affixed to Persian names it means hardly more than esquire. Also Turkish for hotel.

Kharkov (khär-kōf'), capital of the government of Kharkov, European Russia; on the Kharkova, an affluent of the Don; has railway communication with Kurch, Mariupol, and Odessa; is a flourishing town, with several good educational institutions, including a uni-

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the frontier of Galicia; was anciently a Moldavian city, and became afterwards an important stronghold of the Turks against the Poles. In 1673 John Sobieski routed here an army of Mohammed IV. The place was twice taken by the Russians, but restored to the Turks, and was finally ceded by the peace of Bucharest to Russia, 1812. Pop. (1900) 30,429.

Khy'ber Pass, gorge in the Khyber Mountains, nearly 30 m. long, inclosed by cliffs of slate, rising 1,000 ft. almost perpendicularly on both sides. It is the principal, and for artillery the only available, road between the Punjab and Afghanistan. A railway now runs from the E. to Peshawar, near the head of the pass, and a small British territory at the pass is called by its name.

Kiangsi (kē-äng'sē), inland province of China; bounded N. by Hupeh and Nganhwei, E. by Chehkiang and Fukien, W. by Hunan, S. by Kwangtung; area, 69,480 sq. m.; pop. (1906) 26,532,125; capital, Nanchang; principal productions, tea, pottery, grass cloth, hemp, paper, and tobacco.

Kiangsu', maritime province of China; bounded N. by Shantung, E. by the Yellow Sea, W. by Nganhwei, S. by Chehkiang; area, 38,600 sq. m.; pop. 13,980,235; capital, Nanking. It forms part of the Great Plain, and is low and level. The soil is exceedingly fertile. Tea, silk, cotton, sugar, and medicines are the principal articles of trade. Rice is also extensively produced. The Grand Canal runs through the whole length of the province.

Kiauchau (kī-ō-chow'), city of China; on the Yellow Sea; in province of Shantung; seized by Germany, 1897; town, harbor, and district ceded to Germany under pressure, 1898, nominally on a ninety-nine years' lease; district created a German protectorate the same year; area of district, exclusive of the bay (about 200 sq. m.), 200 sq. m.; pop. (1905) abt. 33,000; district and bay surrounded by a neutral zone of 2,500 sq. m., with pop. of 1,200,000. The entire district has been thoroughly Germanized, the bay has been greatly improved, and the city is now a free port.

Kickapoos', members of a tribe of N. American Indians, found by Allouez abt. 1667–70 near the portage between the Fox and Wisconsin rivers, probably in what is now Columbia Co., Wis. They were at one time closely allied to the Miamis; roved in bands over a large territory; joined the Foxes to attack Detroit; made headquarters at Peoria on the destruction of the Illinois Confederacy; aided Tecumseh against the Government; fought with Black Hawk; ceded part of their lands to the Government, 1809, 1819; removed to Missouri, Kansas, and Texas; made much trouble in two last states; now reduced to abt. 430 in the U. S. and 400 in Mexico.

Kidd, William, abt. 1650–1701; Scottish navigator; b. probably Greenock; son of a Nonconformist minister; early became a sailor; was rewarded for services rendered the colony at the present city of New York; sailed from Plymouth, England, in command of the *Adventure*, fitted out for the suppression of piracy,

versity. The city has four annual fairs, which are much frequented, especially the wool fair in spring, at which the value of wool sold generally amounts to $5,750,000. Estimated pop. (1907) 173,989.

Kharput', town in Kurdistan; near the Euphrates; occupies a commanding situation on a plateau at the foot of the mountains. A large trade is carried on in cotton, cereals, opium, silk, olive oil, wine, and cattle. It is the headquarters of Roman Catholic and Protestant missions to the Armenians; is the seat of Euphrates College; and has many churches and mosques. American mission property valued at over $60,000 was destroyed here by the mob during the Armenian troubles, 1895. The government officials and the wealthier classes reside in the suburb of Mezereh. Pop. abt. 30,000.

Khartum (khär-tôm'), capital of Egyptian Sudan; on the Blue Nile, about 2 m. from its junction with the White Nile; is the center of several caravan routes; has government offices and barracks, quays, Gordon Memorial College; railway and telegraphic communication with Cairo. It was founded by Mohammed Ali, 1823; was taken by El Mahdi, 1885, and made the scene of a frightful massacre, Gen. Charles Gordon, who had gone there single-handed to assume command of the Egyptian troops, being among the slain; was razed to the ground by Khalifa Abdullah, the Mahdi's successor, 1886; was retaken by Sir Herbert Kitchener, 1898, and rebuilt. See DONGOLA. Pop. abt. 15,000.

Khayyam (khī-yäm'), **Omar.** See OMAR KHAYYAM.

Khazars, or **Chazars** (khä'zärz), powerful tribe probably allied to the Georgians and Armenians; settled in the regions between the Don, the Volga, and the Caucasus, and at various times between the second and the eleventh centuries playing a conspicuous part in Eastern politics. They formed an independent state and had kings of their own. Their capital, Itil, was a commercial center of considerable importance. The Khazars seem to have had their most brilliant period in the tenth, but were utterly vanquished in the eleventh century by the rising Slav power in Russia.

Khedive (kā-dēv'), official title of the Viceroy of Egypt, first conferred, 1867, by special firman of Sultan Abdul Aziz on Ismaïl Pasha, fifth viceroy. A second firman, 1868, vested succession to the title in the khedive's descendants in direct line. Since the bombardment of Alexandria by the British fleet, 1882, and the immediate occupation of Egypt by British troops, the office of khedive has possessed only nominal importance.

Khelat', capital of Baluchistan; in a narrow valley 6,800 ft. above the sea. It has some importance as a fortress, but its trade and manufactures are of very little consequence. Pop. abt. 12,000.

Kheper (kĕp'ĕr), Egyptian deity whose emblem was the scarab. His qualities were derived from those of the beetle, which was supposed to perpetuate its species without the aid of the female. The god is called "father of the gods," and in process of time became identified with the rising sun, and so typified the resurrection. He was represented in human shape, surmounted by a beetle or with a beetle-shaped head.

Kherson (khĕr-sōn'), town of European Russia; capital of the government of Kherson; on the Dnieper, 19 m. above its mouth; was founded, 1778, by Potemkin; has several good educational institutions, some manufactures of salt, leather, and rope, extensive shipbuilding, and a large trade in timber. Pop. (1907) est. 59,076.

Khiva (khē'vä), former khanate, now a vassal state of Russia; in central Asia; on the Amu Darya; is of triangular form, with the long side on the river, extending from Bokhara to the Sea of Aral; to the E. are Turkestan and, for a short distance, Bokhara; to the S. and W. the Transcaspian district of Russia; area, 24,000 sq. m.; pop. est. 800,000; chief towns, Khiva (the capital), New Urgenj, Hazar Asp, and Kungrad. From the very earliest times there has existed in the region of Khiva a country called by the Greeks Charismia, and later by the Arabs Kwaresm and Kharism. It appears to have been for centuries a part of the great Persian Empire. Later it fell into the hands of Eastern conquerors, but flourished as an independent empire in the thirteenth century. At this time it appears to have extended from the Hindu Kush to the Caspian. It soon fell before Genghis Khan, and, after a turbulent existence, again before Tamerlane. In 1512 it was conquered by the Usbegs, and has since remained in their hands. At the beginning of the nineteenth century the power of the Khan of Khiva extended from the Caspian to the Sea of Aral and the Amu, but his territory afterwards shrank under Russian aggression until 1872, when it became a vassal state. Khiva, capital of the Russian vassal state of the same name; 20 m. W. of the Amu Darya River; before the Russian occupation it was the greatest slave market in Turkestan; fine carpets and common silks and cottons are made here. The palace of the former khan is an inferior building, and the bazaars are not equal to those of other Oriental cities. The mosque attached to the palace has a high, round tower, ornamented with arabesques. Pop. abt. 5,000.

Khokand (khō-känd'), city of Ferghana, Russian Turkestan; till 1875 the capital of an independent khanate of the same name; 100 m. SE. of Tashkent, on the Karusa River; is a modern city, and one of the most animated and attractive in Turkestan; has one of the richest, finest, and busiest bazaars in central Asia. Pop. (1907) est. 81,354. Khokand, the former independent khahate of central Asia, is now the Russian province of Ferghana.

Khon'su, Egyptian deity, associated in the Theban triad with Amon-Ra and Mut, as their son. He was a moon god, and was identified in later times with Thoth (Khonsu-Thoth), and by the Greeks with Hercules. A special sanctuary was erected for him at Thebes (Karnak) by Rameses III. He was represent-

ed in human form, with the head of the sparrow hawk, surmounted by horns and the sun disk, and was one of the few deities whose image has been found in gold.

Khorassan (khō-räs-sän'), "the country of the sun"; province of Persia, adjoining Afghanistan and the Russian Transcaspian province; area, 140,000 sq. m.; pop. over 800,000; capital, Meshed; is one of the richest countries in Persia, and is very fertile, except in the desert areas of the S. and W. The mountains are rich in ores and precious stones.

Khorsabad (khōr-sä-bäd'), village of Asiatic Turkey about 13 m. NE. of Mosul, occupying the site of the Assyrian capital Dūr-Sharrukin ("castle of Sargon"), the remains of which were discovered by Botta, 1843. The excavators of Khorsabad erroneously gave the name of Nineveh to that place.

Khorya Morya, or Kuria Muria (kō'rē-ä mō'rē-ä), group of three islands and four islets on the coast of Arabia, in about lat. 17° 33′ N., lon. 56° E.; ceded to the British by the Sultan of Muscat for the purpose of landing the Red Sea cable, and politically attached to Aden; total area, 21 sq. m.

Khosru (kōs-rō'), **Khusrau'**, or **Chosroes** (kōs'-rō-ēz) I, called NUSHIRVAN, "noble spirit," d. 579; Persian monarch; third son of Kavadh, Kobad, or Cobades, by whose will he succeeded to the throne, 531; waged war with Justinian, the Byzantine Emperor, who concluded an ignoble peace by agreeing to pay an annual tribute of 440,000 pieces of gold; suppressed the Zendiks, a politico-religious sect; warred, 1540-62, against Justin II, who obtained the revolted provinces of Colchis and Lazica, but was obliged to pay an annual tribute of 40,000 pieces of gold. He renewed the war, 571, Armenia having revolted, with the support of Justin, and was defeated at Melitene, Armenia. The throne was left to his son Hormazd (or Hormisdas) IV.

Khosru II, surnamed PARVEZ, or PURNIZ, "the Conqueror"; d. 628; Persian monarch; grandson of Khoru I; succeeded his father, Hormazd IV, who was deposed, 590, by a rebel general; with the aid of the Greek Emperor Mauritius regained the throne and, in recompense, ceded a great part of Mesopotamia. On the murder of Mauritius by Phocas, 602, Khosru made war on the usurper, and within a few years conquered Syria, Egypt, and Asia Minor; but Heraclius, who had succeeded to the throne, recovered his lost possessions, reduced Khosru to extremities, and even ravaged his palace. In consequence of these misfortunes Khosru was deposed and murdered by his son Shirweh.

Khotan (khō-tän'), city of Chinese Turkestan; on the Khotan Darya; 180 m. SE. of Yarkand; has manufactures and a thriving trade in silk fabrics, leather, and paper, and in yu, the jasper of the ancients. The place is celebrated for its musk and for the beauty of the native population. Pop. abt. 40,000.

Khotin (khō-tēn'), or **Chotin'**, fortified town of Russia, in Bessarabia; on the Dniester, near the frontier of Galicia; was anciently a Moldavian city, and became afterwards an important stronghold of the Turks against the Poles. In 1673 John Sobieski routed here an army of Mohammed IV. The place was twice taken by the Russians, but restored to the Turks, and was finally ceded by the peace of Bucharest to Russia, 1812. Pop. (1900) 30,429.

Khy'ber Pass, gorge in the Khyber Mountains, nearly 30 m. long, inclosed by cliffs of slate, rising 1,000 ft. almost perpendicularly on both sides. It is the principal, and for artillery the only available, road between the Punjab and Afghanistan. A railway now runs from the E. to Peshawar, near the head of the pass, and a small British territory at the pass is called by its name.

Kiangsi (kē-äng'sē), inland province of China; bounded N. by Hupeh and Nganhwei, E. by Chehkiang and Fukien, W. by Hunan, S. by Kwangtung; area, 69,480 sq. m.; pop. (1906) 26,532,125; capital, Nanchang; principal productions, tea, pottery, grass cloth, hemp, paper, and tobacco.

Kiangsu', maritime province of China; bounded N. by Shantung, E. by the Yellow Sea, W. by Nganhwei, S. by Chehkiang; area, 38,600 sq. m.; pop. 13,960,235; capital, Nanking. It forms part of the Great Plain, and is low and level. The soil is exceedingly fertile. Tea, silk, cotton, sugar, and medicines are the principal articles of trade. Rice is also extensively produced. The Grand Canal runs through the whole length of the province.

Kiauchau (kī-ō-chow'), city of China; on the Yellow Sea; in province of Shantung; seized by Germany, 1897; town, harbor, and district ceded to Germany under pressure, 1898, nominally on a ninety-nine years' lease; district created a German protectorate the same year; area of district, exclusive of the bay (about 200 sq. m.), 200 sq. m.; pop. (1905) abt. 33,000; district and bay surrounded by a neutral zone of 2,500 sq. m., with pop. of 1,200,000. The entire district has been thoroughly Germanized, the bay has been greatly improved, and the city is now a free port.

Kickapoos', members of a tribe of N. American Indians, found by Allouez abt. 1667-70 near the portage between the Fox and Wisconsin rivers, probably in what is now Columbia Co., Wis. They were at one time closely allied to the Miamis; roved in bands over a large territory; joined the Foxes to attack Detroit; made headquarters at Peoria on the destruction of the Illinois Confederacy; aided Tecumseh against the Government; fought with Black Hawk; ceded part of their lands to the Government, 1809, 1819; removed to Missouri, Kansas, and Texas; made much trouble in two last states; now reduced to abt. 430 in the U. S. and 400 in Mexico.

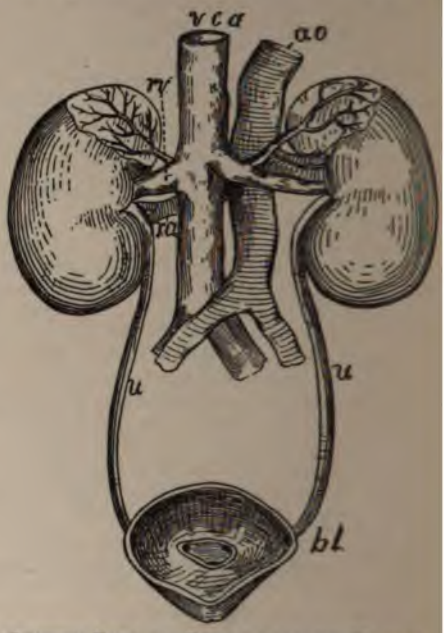
Kidd, William, abt. 1650-1701; Scottish navigator; b. probably Greenock; son of a Nonconformist minister; early became a sailor; was rewarded for services rendered the colony at the present city of New York; sailed from Plymouth, England, in command of the *Adventure*, fitted out for the suppression of piracy,

1696, but, according to the general belief, he became a pirate himself. He landed in New York, 1698, with a large amount of treasure, which was seized by the Earl of Bellomont; and an additional treasure which Kidd had buried on Gardiner's Island was also recovered. Kidd himself was sent to London, where he was hanged for the murder of William Moore, a seaman. The trial was very unfair, and there is some reason for believing that Kidd was not guilty of the crimes which have made his name so notorious. Search for more of his buried treasure is still being made spasmodically all along the New England coast.

Kid'derminster, town of Worcester Co., England; 14½ m. N. of Worcester; was anciently called Chiderminster, and was a royal manor from the time of the Conquest till the reign of Henry III; especially noted for its carpet manufactures, established 1735. Pop. (1901) 24,680.

Kid'naping, a common-law misdemeanor (though now usually defined by statute) which consists in the false imprisonment and abduction of a person. If the party is seized and an actual transportation takes place, though not from the country, the offense is complete. The free consent of one capable of consenting to the act would prevent its being a crime. If a child is assigned to one of its parents under a decree of divorce, the other parent, or his agent, who carries it off without authority, kidnaps the child. See ABDUCTION.

Kid'ney, special organ in vertebrated animals, whose office is to separate from the blood certain effete substances, to be thrown out of the system in the urine; it has no direct connection with any of the nutritive operations concerned in digestion. In man the kidneys are situated in the lumbar region, one on each side of the spine, on a level with the last two dorsal and the first two lumbar vertebræ; they are brownish red, bean-shaped, and flattened from before backward. They are well supplied with blood, in accordance with the importance of their function; the renal arteries come directly from the aorta, and the large veins terminate in the vena cava; the nerves come from the renal plexus of the sympathetic system. They are covered by a thin, firm, transparent envelope; internally they are made up of two structures, an exterior or cortical and an interior or medullary. The cortical substance is made up of a great number of very twisted uriniferous tubes. Scattered through the structure formed by these tubes and the blood vessels are dark points, called from their discoverer Malpighian bodies. These are masses of minute blood vessels included in flasklike enlargements of the uriniferous tubes, forming a close relation between the circulating, and the secreting systems. The medullary substance is composed principally of tubes passing nearly straight inward to the central receptacle of the secretion, which is then conveyed through the ureters to the bladder. The kidneys serve to regulate the quantity of water in the system, a large amount of which may be got rid of through their agency. Their special function is to take the urea from the blood. As the skin and lungs, the other channels thro which superfluous water is removed from t



SHOWING FORM AND POSITION OF THE KIDNEYS.
Ao, aorta; vca, vena cava ascendens; ra, renal arte rv, renal vein; u, ureters; bl, bladder.

blood, are liable to be greatly affected external circumstances, the kidneys perform

SECTION OF THE KIDNEY SHOWING STRUCTURE.
P, pelvis; u, ureter; m, medullary; c, cortical porti aa, arteries.

very important office in relation to that fun When the pores of the skin are closed, as i

cold weather, more work is thrown on the kidneys. In the fetus at an early period, while the kidneys are very small and imperfect, their office is performed by the "Wolffian bodies," two organs analogous to them in structure, which afterward become atrophied and disappear. In fishes the Wolffian bodies remain as permanent organs, no true kidneys being developed. One diseased kidney may be surgically removed, whereupon the remaining kidney will increase in size and perform the function for both. But the removal of both kidneys is soon followed by death.

Ki'do Takayosh'i, abt. 1833–81; Japanese statesman and one of the founders of modern Japan; b. province of Choshiu. His province was one of the first to raise the standard of revolt against the Tokugawa shogunate, and he was one of the chief organizers of the imperialist army; after peace was restored he became a privy councilor; was a member of the embassy which visited the U. S. and Europe, 1872, but returned to receive the appointment of Minister of State; was next appointed to a position in the imperial household, and in the early part of 1875 again entered the cabinet.

Ki'dron, or Ce'dron, small stream or brook in the valley E. of Jerusalem; memorable in many scenes of biblical history.

Kieft (kēft), **Wilhelm**, 1600–47; fifth Governor of New Netherlands; b. Holland. He concentrated all the executive power in the colony in his own hands. New Amsterdam was in wretched condition on his arrival, and he instituted some very beneficial reforms. He improved the appearance of the town, enforced police ordinances, promoted agriculture, but his government was marked by such tyranny and cruelty that he was detested by the people. His maltreatment of the Indians caused retaliation on their part, and to cope with the situation the governor called the first representative assembly in the New Netherlands. He was finally recalled in 1647, on petition of the colonists, and perished on his way to Holland by the sinking of the ship.

Kiel (kēl), town in duchy of Holstein, Prussia; on the Kieler Fjord; is well built and beautifully situated; has a university (founded 1665), some manufactures, and an important trade. Its harbor is one of the best on the Baltic, deep and safe, and very strongly fortified; it is the station of the German fleet in the Baltic, and the seat of all institutions belonging to the German navy. Kiel belonged to the Hanseatic League, and possessed the right to the trade between Germany and Denmark. The peace between Denmark and Sweden was concluded here January 14, 1814. Pop. (1905) 103,772.

Kiepert (kē'pĕrt), **Heinrich**, 1818–99; German geographer; b. Berlin; explored Asia Minor, 1841–42; Director of the Geographical Institute of Weimar, 1845–52; became professor at the Univ. of Berlin, 1859. His "Atlas of Hellas and the Hellenic Colonies" and his maps to Robinson's "Palestina" attracted the attention of the scientific world. His "New Hand Atlas of the Earth" is the standard work on the subject. Among other works are "Atlas of the Old World" and "Travels in Asia Minor."

Kiev (kē-ĕf'), fortified capital of the government of Kiev, Russia; on the Dnieper; founded in the ninth century; is one of the oldest and most beautiful cities of Russia; consists, properly, of three towns, each with its own walls and fortifications—namely, Petchersk, with the famous monastery of Petcherskoi, containing the tombs of many Russian saints; Kiev proper, with the celebrated Cathedral of St. Sophia; and Podol, which is occupied by the middle and lower classes. Kiev has a university and several other educational institutions. Its manufactures are not important, but its trade is extensive. Pop. (1902) 319,000.

Kilauea (kē-low-ā'ä), volcano in Hawaii; one of the largest in the world; is in constant activity; crater is 8 m. in circumference, and varies from 300 to 1,500 ft. in depth.

Kil'ian, Saint, d. 607; Irish prelate; b. county Cavan. Abt. 689 he went as a missionary to Franconia, Germany, whose ruler he converted, together with his subjects; but the ruler's wife brought about his beheading at Würzburg in revenge for her repudiation by the ruler on Kilian's demand, she being the lawful wife of another man.

Kilimanjaro (kĭl-ē-mān-jä-rō'), "Great Mountain," a mountain discovered (1848) by the missionary Rebmann in E. Africa; situated about 175 m. S. of the equator, and the same distance inland from the Indian Ocean. Rebmann's report that Kilimanjaro was snow-crowned was long discredited. It is believed to be the highest mountain in Africa, and is one of the great volcanic mountains of the E. part of the continent. All climates from tropical to polar are found on its slopes.

Kilken'ny, town in county of Kilkenny, Ireland; on the Nore; 81 m. SW. of Dublin. It has a college, a grammar school, in which Swift, Congreve, Farquhar, and Berkeley received part of their education. The Cathedral of St. Canice dates from the eleventh century, and is the largest ecclesiastical building in Ireland, next to the Cathedral of St. Patrick in Dublin. There are some manufactures of coarse woolens and linens. Pop. (1900) 10,493.

Killar'ney, market town of Kerry Co., Ireland; 44 m. NNW. of Cork; in the midst of beautiful scenery, and about a mile from the celebrated lakes to which it gives its name. The town contains a magnificent Roman Catholic cathedral, a dispensary and fever hospital, etc. The lakes are connected with each other; the lower lake is about 4½ m. long by 2 m. broad; the middle, 1½ m. long by ½ m. broad; the upper, 3 m. long. They receive several streams, and are dotted with numerous islands. On a projecting peninsula which divides the middle from the lower lake stand the picturesque ruins of Muckross Abbey and Ross Castle. Pop. abt. 5,500.

Killiecran'kie, celebrated pass through the Grampian Mountains, in Perthshire, Scotland,

"A Year of Consolation," "Residence on a Georgia Plantation in 1838–39," and "Old Woman's Gossip"; after 1848 she gave Shakespearian readings in the U. S. and Great Britain.

Kemble, John Mitchell, 1807–57; Anglo-Saxon scholar; oldest son of Charles Kemble; b. London; devoted himself to the study of the earliest Teutonic dialects, and published, 1833, "The Anglo-Saxon Poems of Beowulf," with a glossary and translation; edited *The British* and *Foreign Quarterly Review*, 1835–44; published "Codex Diplomaticus Ævi Saxonici," and "The Saxons in England," his best known work.

Kem'pelen, Wolfgang (Baron von), 1734–1804; Hungarian mechanician; was the inventor of a so-called automaton chess player, made for the amusement of the Empress Maria Theresa (1769), which was exhibited in Paris, 1784, and afterwards in Great Britain and the U. S. It was an ingenious contrivance for concealing a living player. He also invented, 1778, an automaton speaking human figure, which he explained in "Le mécanisme de la parole." He filled several political posts at the Austrian court, and published poems and dramatic pieces.

Kem'per, Reuben, d. 1826; American soldier; b. Virginia; settled in the Territory of Mississippi; sought to rid W. Florida of its Spanish rule, and subsequently devoted himself to the task of driving the Spaniards from the American continent. He was engaged in an unsuccessful attempt to capture Mobile and in the expedition of Gutierrez and Toledo, 1812, against the Spanish authority in Mexico, and was colonel of the force, 500 or 600 in number, which coöperated with the Mexican insurgents. The expedition advanced into Texas and fought several battles, but disagreed with their allies and returned home. Kemper was engaged under Jackson in the defense of New Orleans.

Kem'pis, Thomas à, 1380–1471; German ascetic writer; b. near Cologne; began his noviceship at the monastery of Mount St. Agnes, 1400, and, 1413, was ordained priest; 1425, was elected subprior of the monastery, and was charged with the spiritual direction of the novices. He owes his world-wide fame to the book entitled "De Imitatione Christi," which has been many times translated into every civilized language. Its authorship has been ascribed to Jean Gerson, chancellor of the Univ. of Paris, and to Gersen or Gesen, an Italian abbot. The external evidences in favor of à Kempis are the facts that he is mentioned as the author by three writers nearly his contemporaries, that copies exist written in his own hand, and that in one ancient copy he is declared to be the author.

Kenai (kēn'ī), peninsula on the S. coast of Alaska; between Cook's Inlet and Prince William's Sound; coast is much indented; Day's Harbor and Resurrection Bay afford good anchorage; interior little known; mountainous and infertile; glaciers said to occupy some of the valleys.

Ken'dal, William Hunter, 1843– ; English actor; b. London; family name GRIMSTON; entered the dramatic profession, 1861; member of the company of the Theater Royal, 1862–66; appeared in London in "A Dangerous Friend," and his talent met with gratifying recognition; subsequently played *Orlando* in a revival of "As You Like It," and took such parts as *Captain Absolute* and *Charles Surface*; also played in Gilbert's most successful pieces, "The Palace of Truth" and "Pygmalion and Galatea." In 1869 he was married to Madge (Margaret) Robertson (b. Great Grimsby, 1848), and as Mr. and Mrs. Kendal they afterwards acted in the same companies and made several successful tours in the U. S.

Ken'ilworth, town in Warwickshire, England; contains ruins of Kenilworth Castle, which became notable in the history of Queen Elizabeth on account of the gorgeous manner in which the Earl of Leicester entertained her here for seventeen days. See Sir Walter Scott's "Kenilworth."

Ken'ites, nomadic people between Sinai and Palestine, first mentioned in Gen. xv, 19, and numerous times later, and always as having friendly relations with the Chosen People. They inhabited the desert lying between S. Palestine and the Sinai Mountains, and roamed over this region and along the E. coast of the Gulf of Akabah. Jethro, the father-in-law of Moses, is called a Midianite in Ex. iii, 1 and Num. x, 29, and a Kenite in Judg. i, 16. Many of the Kenites accompanied the Israelites in their desert march and entered with them into the Promised Land, but retained their nomadic habits.

Kennebec' Riv'er, stream which rises in Moosehead Lake, Me., although its principal head stream, the Moose River, rises more than 50 m. W. of that lake, of which it is a tributary. The river falls some 1,000 ft. in 100 m., reaching tide water at Augusta, where it is crossed by a large dam, affording great water power. Seagoing steamboats and coasting vessels ascend to Gardiner, except in winter, when navigation ceases entirely. The river is navigable for ships to Bath, 12 m. Its banks are fertile and beautiful, and are the seat of a large trade in lumber, provisions, hay, cattle, etc. The Androscoggin River is the largest tributary of the Kennebec, joining it at Merrymeeting Bay, 18 m. from the ocean.

Ken'rick, Francis Patrick, 1797–1863; American Roman Catholic prelate; b. Dublin, Ireland; became principal of the ecclesiastical seminary at Bardstown, Ky., 1821; coadjutor to Bishop Conwell, of Philadelphia, 1830, and his successor, 1842. In Philadelphia he founded the Theological Seminary of St. Charles Borromeo. He was appointed archbishop of Baltimore, 1851; presided as apostolic delegate over the first Plenary Council the U. S., 1852, and, 1859, received for his see the "primacy of honor" in the U. S. His numerous theological works are regarded as classical in the U. S., and used as text-books in seminaries. At the time of his death he was engaged on a revised English translation of the Bible, with

copious notes, and had published the whole of the New Testament and the greater part of the Old.

Kent, Edward Augustus (Duke of), 1767–1820; fourth son of King George III of England; joined the army; participated in the capture of some of the French W. India islands; was appointed governor of Nova Scotia and commander in chief of the British forces in N. America. The island of St. John changed its name to Prince Edward in his honor. On his return to Europe he married (May 20, 1818) a German princess, Maria Louisa Victoria (1786–1861), widow of the Prince of Leiningen, daughter of the Duke of Saxe-Coburg. From this marriage Queen Victoria was born, 1819.

Kent, James, 1763–1847; American jurist; b. Philippi, N. Y.; became judge of the Supreme Court of New York, 1798; was its chief justice, 1804–14; chancellor of the state, 1814–23; Prof. of Law in Columbia College; was one of the fathers of American jurisprudence; chief work, "Commentaries on American Law."

Kent, William, abt. 1685–1748; father of English landscape gardening; b. Yorkshire; was apprenticed to a coach painter, and showed so much talent that he was enabled by the help of patrons to study art at Rome. In 1716 he was invited by the Earl of Burlington to return to England as his guest, and resided with that nobleman for the remainder of his life. He was in some demand as a painter, sculptor, and architect, but his real importance was as the founder of landscape gardening in England, the best specimen of the new principles of taste being Kensington Gardens.

Kent Is'land, largest island in Chesapeake Bay; belongs to Queen Anne Co., Md.; 15 m. long, and very fertile; has important oyster fisheries; is the site of the earliest settlement in the state; was colonized, 1631, by William Clayborne.

Ken'ton, Simon, 1755–1836; American pioneer; b. Fauquier Co., Va. At sixteen had an affray arising from a love affair, and believing he had killed his adversary, fled beyond the Alleghanies, and became a companion of Daniel Boone, whose life he saved in a conflict with Indians. He accompanied George Rogers Clark on his expedition to Kaskaskia, 1778. He showed great courage and sagacity in obtaining information as to the Indians' movements; was a major under Gen. Anthony Wayne, 1793–94; brigadier general of Ohio militia, 1805, and fought at the battle of the Thames, 1813. As Kentucky filled with settlers, Kenton was reduced to poverty, for his immense tracts of land were lost through his ignorance of law. But after 1824 his lands were released and a pension of $240 a year was procured for him from Congress. He died near the spot where, fifty-eight years before, he had narrowly escaped death at the hands of the Indians.

Kentuck'y (name derived from the Iroquois Indian *Kentake*, meaning prairie or meadow land, in allusion to the treeless tract in the S. central part of the state), popular names, BLUE-GRASS STATE, CORN-CRACKER STATE; state flower, golden-rod; state in the S. central division of the N. American union; bounded N. by Illinois, Indiana, and Ohio, from which it is separated by the Ohio River; NE. by W. Virginia, SE. by Virginia, S. by Virginia and Tennessee, W. by Missouri and Arkansas, from which it is separated by the Mississippi River; area, 40,400 sq. m.; estimated pop. (1906) 2,320,298, including abt. 285,000 negroes; capital Frankfort; principal cities and towns: Louisville, Covington, Newport, Lexington, Paducah, Owensboro, Henderson, Bowling Green, Hopkinsville, Ashland, Maysville, Bellevue, Dayton, Winchester, Richmond, Paris, Danville, Middlesboro.

The surface, with the exception of about 2,000,000 acres of high land in the mountains, and 500,000 acres of low lands in the river bottoms, is a plateau, gently sloping from the

mountains on the E. to the rivers on the W. and NW.; average elevation above the sea, 800 ft.; principal mountain area in the SE., where are Cumberland Mountain and Pine Mountain, and some peaks 2,500 ft. above the Cumberland River valley. Besides the Mississippi, the Ohio, and the Big Sandy rivers, which lie on its borders, there are five internal rivers, the Licking, Kentucky, Salt, Green, and Cumberland, all navigable. The Tennessee rises within a mile of the source of the Cumberland, but runs most of its course in Tennessee and Alabama, then enters Kentucky near the Cumberland, and runs parallel with it to the Ohio. There is one canal, at Louisville, which enables loaded vessels to pass around the falls of the Ohio without breaking bulk.

In the E. central part of the state is the far-famed "blue-grass" region; adjoining it partly, a tract misnamed "the barrens" by the early settlers from its treeless character. The soil is very fertile in the "blue-grass" region and on the river bottoms. The climate is not subject to the extremes common to other states in the same locality. The temperature seldom exceeds 100° F. in summer, or falls below zero in winter. Rain falls abundantly in winter and spring. In the mountain region of E. Kentucky is an area of some 12,000 sq. m., where bituminous, block, and cannel coals are

found, and in the W., bordering on Illinois and Indiana, is an area of about 4,000 sq. m., yielding block and cannel coals. From the Ohio to the Cumberland extends a tract of blue limestone. The coal fields contain extensive beds of iron ore and quarries of stone of large variety. Among other products are fire clay, molding sand, potter's clay, glass sand, sulphur, lead, niter, fluorspar, asphaltum, petroleum, and natural gas. Salt, sulphur, saline, and chalybeate springs are numerous. In the Green River region are numerous caverns, including the Mammoth Cave. The total value of the mineral products (1907) was $19,294,-341, including coal, $11,405,038; fluorspar, $133,911; clay products, $2,611,364; stone, $1,-002,450.

The principal farm crops, 1906, were: Corn, 105,437,376 bushels, valued at $44,283,698; winter wheat, 11,542,598, $8,426,097; oats, 4,-430,354, $1,683,535; rye, 162,260, $113,582; potatoes, 2,848,352;, $1,737,495; hay, 603,723 tons, $7,999,330; and tobacco, 252,300,000 lbs., $19,427,100—total value, $83,670,837. The live stock (1907) comprised 387,327 horses, valued at $37,679,162; 198,850 mules, $21,628,-928; 402,000 milch cows, $11,256,000; 736,250 other cattle, $12,972,716; 1,060,000 sheep, $4,-478,500; and 1,213,380 swine, $7,280,280—total value, $95,295,586. According to the U. S. census of 1905, Kentucky had 3,734 factory-system manufacturing plants, operated on a capital of $147,282,478, and yielding annual products valued at $159,753,968. The principal manufactures were flour, foundry and machine-shop products, tobacco and cigars, whisky, malt liquors, iron and steel, jeans, leather, carriages and wagons, hydraulic cement, furniture, agricultural implements, lumber, saddlery and harness, woolen and cotton goods, bagging and rope, and salt (chiefly by evaporation).

The leading educational institutions are Kentucky Univ. (Christian), founded, 1798, as Transylvania Univ., Lexington; State Agricultural College, Lexington; Central Univ. (Presbyterian), Danville; Bethel College (Baptist), Russellville; Union College (Methodist Episcopal), Barbourville; State Univ. of Kentucky (Baptist), Louisville; Georgetown College (Baptist), Georgetown; Berea College (nonsectarian), for white and colored, Berea; St. Mary's College (Roman Catholic), St. Mary's; and normal schools at Bowling Green, Madisonville, Corinth, etc. The principal religious bodies are the Baptist, Roman Catholic, Methodist Episcopal South, Disciples of Christ, Methodist Episcopal, and Presbyterian. There are institutions for the blind and the deaf and dumb in Louisville and Danville; asylums for the insane in Anchorage, Lexington, and Hopkinsville; a house of refuge in Louisville; a large penitentiary in Frankfort and a branch in Eddyville.

Daniel Boone and others made explorations in the region, 1769; permanent settlements were established by Boone, James Harrod, and Benjamin Logan, 1775; the Transylvania Company purchased the greater part of Kentucky from the Cherokees, and numbers of colonists entered. In 1776 the Virginia Legislature erected this purchase into the county of Transylvania, and, 1783, formed Kentucky into one district. Conflicts between the colonists and the Indians caused Kentucky to be called "the dark and bloody ground," and the foes were not quelled till 1794, when Gen. Wayne won the battle of Fallen Timbers. Attempts to separate Kentucky from Virginia failed until 1790, when the mother state consented, and on June 1, 1792, Kentucky entered the Union. At the beginning of the Civil War the state took a neutral position, but 80,000 of her citizens entered the Union army, and 4,000 the Confederate. Federal and Confederate forces entered, and during the latter part of 1861 numerous skirmishes and unimportant engagements occurred. In November a convention assembled at Russellville, then within the Confederate lines, organized a provisional government, and, 1862, an attempt was made to inaugurate it at the capital, which the advance of Union troops prevented. At Mill Spring, January 19, 1862, Gen. George H. Thomas defeated the Confederate forces, and after the fall of forts Henry and Donelson in Tennessee, the Confederates withdrew from the state, but returned under Gen. Bragg in September, only to be defeated at Perryville, and to again withdraw. The state continued to be disturbed by raids, and martial law was declared by Pres. Lincoln, 1864. The civil authority was restored by Pres. Johnson, October 18, 1865. During the crisis growing out of the contested election of 1899, William Goebel, the governor elect, so claimed by the Democratic Party, was assassinated, January 30, 1900.

Kentucky, river of Kentucky which rises in the mountains of Letcher Co., flows in a tortuous NW. course some 250 m., reaching the Ohio at Carrollton. Its head streams flow through a rough region abounding in iron, coal, and salt. Great amounts of money have been expended in improving the navigation of this beautiful stream, which steamboats now ascend to Frankfort, 60 m., and flatboats for 150 m.

Kentucky and Virgin'ia Resolu'tions, in U. S. political history, two series of resolutions passed by the legislatures of Kentucky and Virginia in 1798 and 1799. The Kentucky resolutions were drafted by Thomas Jefferson, and asserted that "the several states being sovereign and independent have the unquestionable right to judge of the infractions of the Constitution, and that a nullification by those sovereignties of all unauthorized acts done under color of that instrument is the rightful remedy." Similar resolutions were passed by the Virginia Legislature. This extreme state's-rights doctrine was communicated to the legislatures of the other states, but was generally disapproved.

Ke'okuk, city in Lee Co., Iowa; on the Mississippi River near its confluence with the Des Moines; 46 m. S. of Burlington; is at the foot of the lower rapids, 12 m. long, with a fall of 24 ft., around which the U. S. Govt. has constructed a ship canal at a cost of $8,-000,000. The city is built on limestone bluffs 150 ft. high, overlooking the river, here crossed

by a railway and highway bridge 2,300 ft. long; is the center of a rich agricultural, fruit-growing, and stock-raising region, and is distinctively a jobbing and manufacturing city, with direct steamboat communication with St. Louis, St. Paul, and other large cities. It contains the Keokuk Medical College, Keokuk Dental College, College of Physicians and Surgeons, St. Vincent's Academy and St. Peter's Boys' School (both Roman Catholic), Home for the Friendless, Mercy and St. Joseph's hospitals, U. S. Govt. building, and a National Soldiers' Cemetery. Pop. (1900) abt. 15,000.

Kep'ler, Johann, 1571–1630; German astronomer; b. Würtemberg; studied astronomy under Möstlin, a disciple of Copernicus; 1594, became Prof. of Mathematics in the Univ. of Gratz; published an almanac for 1595, and, 1596, his "Cosmographical Mystery," containing a fanciful theory of the order of the heavenly bodies. He next accepted Tycho Brahe's invitation to go to Prague and assist him in the preparation of a new set of astronomical tables, which the Emperor Rudolph II intended to substitute for those calculated on the Ptolemaic and Copernican systems. Tycho shortly afterwards died, and Kepler succeeded him as principal mathematician. In his optical treatise, "A Supplement to Vitellio," published 1604, he was singularly successful in analyzing the structure of the eye. In this work he also described the mode of calculating eclipses which obtains at the present day. In his work on optics, entitled "Dioptrics" (1611), he described the astronomical telescope, having two convex lenses, by which objects are seen inverted. These discoveries, however, are obscured by the greatness of those announced in his "New Astronomy, or Commentaries on the Motions of Mars" (1609), which constitute the first two of the three great laws of planetary motion known as Kepler's laws, namely, the ellipticity of the planetary orbits, and the fact that the radius vector of every planet passes over equal areas in equal times. Between 1618 and 1622 appeared the seven books of his "Epitome of the Copernican Astronomy," which was placed by the Inquisition on the list of prohibited books; and, 1619, he published his "Harmonies of the World," memorable as containing the third of his celebrated laws, *viz.*, that the squares of the periodic times of the planets are proportional to the cubes of their mean distances from the sun. The Rudolphine tables were published, 1627. In 1629 he removed to Sagan in Silesia, and soon afterwards secured a professorship in the Univ. of Rostock. In 1630 he went to Ratisbon, and made another fruitless effort to obtain from the imperial assembly his arrears, which amounted to 8,000 crowns. Vexation, combined with fatigue, brought on a fever which proved fatal. Between 1594 and 1630 he published thirty-three works, besides leaving twenty two volumes of manuscripts.

Keram'ics, or Ceram'ics, art of making objects of clay or some natural earth, or in the case of soft porcelain of an artificial mixture of earths and minerals, which vessels are made solid and durable by exposing them to a great heat; also the objects themselves, taken collectively; also the study of the art and of its history. In each of these senses the term covers and includes a number of rather general terms, such as earthenware, pottery, stoneware, porcelain, as well as many names of separate and distinct kinds of ware. Nearly all the famous wares which play so important a part in the history of the decorative arts are included under earthenware. Thus the famous Greek painted vases are either of terra-cotta or of a softer earthenware with a surface very slightly glazed or enameled. Nearly all the splendid ornamental wares of the sixteenth and seventeenth centuries belong to the class of enameled pottery; thus majolica, the enameled terra-cotta called Della Robbia from the great artists who used it for their important compositions, Palissy ware, Dutch decorative pottery or delft, and the many kinds of French ware, as Moustiers, Rouen, Nevers, etc., are all varieties of faïence.

All the above-named wares, and all kinds of earthenware as here considered, have a porous paste. If a broken edge is touched to the tongue, the tongue seems to cling to it, as it takes up the moisture very rapidly; but in stoneware, the next great division, the paste is not porous, it is partly vitrified throughout its whole mass, and is much more compact. It is stoneware that is used for vinegar jugs and pickle jars and German beer mugs. The most ornamental kind of stoneware is that known as *grès-de-Flandres*, or Flemish ware, and also as Cologne ware; it is gray in color, hard and smooth, mottled, and decorated with blue; its peculiar ornamentation is by means of patterns in low relief, made by stamps, and also by the very quaint and peculiar shapes given to the vessels made of it. This ware has generally a very thin glaze, made either by the further vitrification of the surface in the heat of the oven, or by means of common salt. The peculiarity of porcelain is its translucency. Chinese and Japanese porcelain had been imported into Europe for many years before any serious attempt was made in Europe to produce a similar ware. The various experiments tried in the seventeenth century resulted in what is called soft or tender porcelain, which is indeed hardly a keramic ware at all, as it is composed of many different ingredients and scarcely at all of natural clay or other earth. At length a porcelain clay was found in Europe, and the hard porcelain of Sèvres, Vienna, and Berlin began to be made at the national factories of those cities toward the close of the eighteenth century. See also POTTERY AND PORCELAIN.

Kerbela (kĕr-bā'lä), or **Meshed-Houssein** (mĕsh-ĕd'-hōs-sān'), city of Asiatic Turkey; in the vilayet of Mesopotamia; 50 m. SW. of Bagdad; has five gates, an extensive and well-supplied bazaar, and many khans. Houssein, the most revered martyr of the Shiite Mussulmans, son of the Caliph Ali and of the prophet's daughter Fatima, was massacred here, 680. His magnificent tomb is annually visited by about 200,000 pilgrims. Pop. (1900) 65,000.

Kerguelen (kĕrg'ĕ-lĕn) **Is'land** (named from its discoverer, Ives Joseph de Kerguelen-

industries are seed crushing and oil refining from linseed and rapeseed, the manufacture of sailcloth and rope, washing blue, blacklead, oil paint, colors, varnish, cement, glass, starch, and paper. There are also several engineering, chemical, and tar works, iron foundries, and breweries. Upward of 450 first-class deep-sea fishery boats belong to the port, and about 3,000 persons residing within the port are engaged in fishing. Hull owed much of its early prosperity to its merchant princes, the De la Poles, afterwards earls of Suffolk, who were the friends of successive kings of England. In Elizabeth's reign it furnished £600 and 800 men for the defense of the kingdom against the Spanish Armada. In the civil war of the seventeenth century Hull adhered to the parliamentary powers, and twice withstood successfully sieges by the Royalists. In the eighteenth century Hull was a good exporting and importing port, and until comparatively recent time was the headquarters of the whale fishery. Pop. of municipal borough (1908, est.) 271,137.

Kings'town, W. Indies. See ST. VINCENT.

Kingstown, town on the Bay of Dublin, Ireland; has a magnificent harbor; is the station of the steam packets to Holyhead and Liverpool; and is one of the most frequented watering places of Ireland. Pop. (1901) 17,356.

King'-teh-chin', town of Kiangsi, China; noted since the middle of the sixth century for its pottery and porcelain, and one of the five *chin* or great commercial emporia of the empire. It lies to the E. of the Poyang Lake, about 25 li, or Chinese miles, from the district city of Fowliang. It is said to possess 3,000 furnaces. Pop. est. at 500,000.

Kin'kel, Johann Gottfried, 1815–82; German author; b. near Bonn; successively taught philosophy and the history of art at Bonn (1837–48). In 1849 he was sentenced to twenty years' imprisonment in the fortress of Spandau as a revolutionist, but escaped, 1850, chiefly with the assistance of Carl Schurz; went from England to the U. S., and subsequently was engaged in teaching, lecturing, and journalism in London till 1866, when he became Prof. of the History of Art at Zürich; wrote works on the fine arts, especially on Christian art, stories, and lyrical poems.

Kioto (kē-ō'tō). See KYOTO.

Kip'ling, Rudyard, 1865– ; Anglo-Indian story writer; b. Bombay, India; was educated in England, but went back to his native country, 1880; was special correspondent for newspapers published in Lahore and Allahabad, and also produced many volumes of tales and poems dealing with the life of the British in India, which obtained an immediate and widespread popularity. Some of these are "The Light that Failed," "The Story of the Gadsbys," "The Naulahka," with Wolcott Balestier, his brother-in-law; "Soldier Tales," "Captains Courageous," "Recessional," "The Day's Work"; two "Jungle" books; "From Sea to Sea," "Kim," "Seven Seas," "Puck of Pook's Hill." He was awarded the Nobel prize for literature in 1907.

Kirchbach (kērkh'bäkh), **Hugo Ewald** (Count von), 1809–87; German general; b. Prussia; in the war against Austria, led with distinction the Tenth Division as lieutenant general; in the war against France he led the Fifth Army Corps. At its head he opened the war by the attack on Weissenburg, and two days afterwards he took a most important part in the battle of Wörth, August 6th. In the battle of Sedan he performed the decisive maneuver by which the French army was surrounded. During the siege of Paris he held Versailles and its vicinity.

Kirghiz (kīr-gēz'), Tartar-Mongol nomadic people of Central Asia, numbering abt. 3,000,000, and occupying a vast region which extends from the Caspian Sea to the Altai Mountains, and from the Sea of Aral to the Tobol and Irtish, and is traversed by several mountain ranges between which lie large barren plains dotted with salt lakes. The Kirghiz are divided into two main branches, the Kirghiz-Kazaks (see COSSACKS), occupying a region called the Kirghiz steppes, and the Kara-Kirghiz, or Black Kirghiz, who occupy the region surrounding Lake Issik-Kul, and called Burut by the Chinese and Mongolians. The Kirghiz-Kazaks are divided into the Little, Great, and Middle Hordes, politically distinct from one another. They are of E. or Turco-Tataric origin, akin to the Uzbecks in race and language. The Buruts, or true Kirghiz, are found in the neighborhood of Issik-Kul, the valleys of the Tien-shan as well as the Altai Mountains, and the Pamir to the S. of Khokand. They are divided into two great divisions, the *On* or right, and the *Sol* or left. They number about 200,000 within the Russian dominions, and there are thought to be about 150,000 in Chinese Turkestan and Khokand. In manners, customs, and religion they resemble the Kirghiz of the steppes.

Kirkcaldy (kīr-kâ'dī), town of Fifeshire, Scotland; on the Firth of Forth; local name, "Lang town"; has large bleaching fields, flax-spinning mills, and manufactures of linen and canvas, and its harbor, though completely dry at low water, admits large vessels at full tide. Pop. (1901) 22,346.

Kirk'wood, Daniel, 1814–95; American astronomer; b. Harford Co., Md.; Prof. of Mathematics, 1851–54, Delaware College; its president, 1854–56; became, 1856, Prof. of Mathematics in Indiana Univ.; author of "Meteoric Astronomy" and "Comets and Meteors," and of many astronomical papers, the most important being one on "The Nebular Hypothesis, and the Approximate Commensurability of the Planetary Periods."

Kirman'. See KERMAN.

Kirmanshah'. See KERMANSHAH.

Kirschwasser (kērsh'väs-sēr), alcoholic *liqueur* prepared from cherries. The ripe fruit is first stoned and then fermented. Afterwards the broken pits are thrown into the mash, and the whole is distilled. An imitation is made of ordinary spirits flavored with cherry-laurel water.

Kishenef', capital of the Russian province of Bessarabia; on the Buik, an affluent of the Dniester; 162 m. NW. of Odessa; situated on three hills, between which the river winds, crossed by several bridges. It is connected by rail with Odessa and Jassy. It is the seat of the civil and ecclesiastical authorities of Bessarabia. It has large markets, especially for cattle and corn. The inhabitants are much engaged in the cultivation of fruit and tobacco. It is also the center of a considerable trade in tallow, wool, wheat, hides, etc., carried hence to Odessa and Jassy. Kishenef existed as a small place in the ninth century, was nearly destroyed in the seventeenth by the Tartars; was transferred, 1812, from Moldavia to Russia, and was the scene of terrible anti-Jewish rioting, beginning on Easter Sunday, 1903, and lasting two days. Pop. (1900) 125,787.

Ki'shon, small river of central Palestine, which rises near Mt. Tabor, and flows NW. into the Mediterranean, draining the plain of Esdraelon and the mountains of Carmel and Samaria. It is famous in biblical history as affording the scenes of the defeat of Sisera by Deborah and Barak, and of the slaughter of the priests of Baal by Elijah.

Kiss, August, 1802–65; German sculptor; b. Pless, Silesia; was a pupil of Rauch in Berlin, and became known by his "Amazon and the Tiger" (1839). His colossal group of "St. George and the Dragon" (1855) was severely criticised. His other productions include a statue of Frederick the Great and two of Frederick William III.

Kissingen (kis'sing-ĕn), town of Bavaria; on the Saale; 60 m. E. by N. from Frankfort on Main; has three mineral springs, from which more than 500,000 bottles of water are annually exported. In summer the place is much frequented, as the water is used both for drinking and for bathing. It is strongly impregnated with iron and salt, and is recommended for a great variety of diseases. Pop. (1900) 4,757.

Kitch'en Cab'inet, in U. S. political history, name derisively applied to a group of men who, though not holding cabinet positions, were supposed, during the administration of Pres. Andrew Jackson, to have greater influence with the President than the cabinet officers themselves. Among the more prominent members of this group were Francis P. Blair, Sr., Duff Green, Amos Kendall, William B. Lewis, and Isaac Hill. The term has since been applied to similar groups of unofficial friends and advisers of Presidents Tyler and Johnson.

Kitchener (kich'ĕ-nĕr), of **Khartum'**, **Horatio Herbert** (first Viscount), 1851– ; British military officer; b. Ballylongford, Ireland; entered the army, 1871; joined the survey of W. Palestine, 1874; returned to England, 1875, and was engaged for two years in preparing the Palestine Exploration Fund's map. He returned to the Holy Land, 1877, and surveyed Galilee. In 1878 he was sent to Cyprus to organize the courts, then became vice consul at Erzerum, but soon returned to Cyprus and made a survey of the island. In 1882 he volunteered for service in the Egyptian army which Sir Evelyn Wood was organizing, and was appointed one of the two majors of cavalry. He served in the Nile expedition of 1884–85, and was decorated for distinguished services. He was then made sirdar, or commander in chief, of the Egyptian army. He was in charge of the entire operations against the Khalifa, successor of the Mahdi, for the recovery of the lost provinces which were under Mahdist rule, 1882–98. The Anglo-Egyptian army began its campaign, 1896, and terminated it, September 2, 1898, with the overthrow of the Khalifa. Kitchener was received on his return to Great Britain with great official favor and popular enthusiasm; was rewarded with a peerage; 1899, was appointed Governor General of the Egyptian Sudan, with large discretionary powers; was chief of staff to Lord Roberts in the campaign in S. Africa, 1899–1900; commander in chief there, 1900–2; then became commander in chief in India.

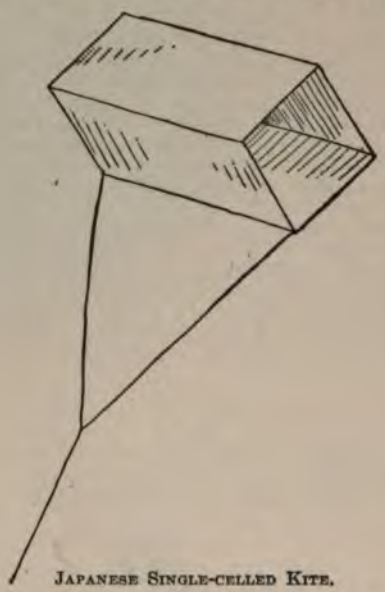
Kite, name applied to birds of prey of the subfamily *Milvinæ*, having rather weak feet, long, pointed wings, and, in many species, a deeply forked tail. Kites are birds of easy, graceful flight, and are usually found in warm

MISSISSIPPI KITE.

latitudes. The common kite of Europe is of a general reddish-brown color. The kite was once very numerous in England, but is now all but exterminated. The swallow-tailed kite of the S. parts of the U. S. is glossy black on wings, tail, and back, white elsewhere, including the rump.

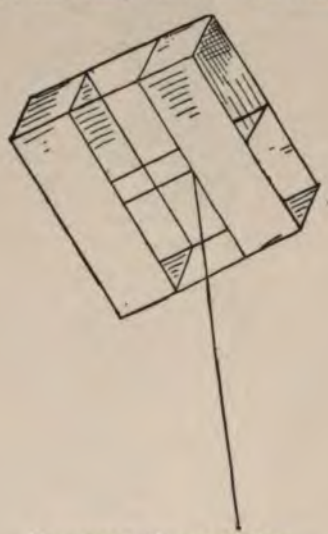
Kite, originally a toy, employed for ages and in many countries by boys as a plaything, which has also had its scientific uses. Thus Franklin and others have obtained the electric spark from the clouds by this dangerous means. In engineering the kite has been employed to carry lines across deep chasms, thus supplying a means of carrying heavier cables, and by their use, in turn, parts of the sustaining frame of the structure during its erection; similarly it has been used to convey life lines across a line of surf and breakers, removing the pas-

sengers of stranded ships. The earliest recorded effort to use the kite for scientific purposes was by Dr. Alexander Wilson and Thomas Melville in Scotland, 1749. The first really suc-



JAPANESE SINGLE-CELLED KITE.

cessful use of the kite in obtaining systematic and trustworthy records from instruments lifted into the air was by Douglas Archibald in England, 1883 and 1884. He elevated anemometers indicating on dials the total move-



TWO-CELLED HARGRAVE KITE.

ment of the wind during given times, and worked out for his locality the law of increase of wind velocity up to a height of about 1,000 ft.

In 1885 Alexander McAdie used a kite with a tinfoil surface collector and a fine copper wire wound around the flying string for the purpose of studying the electricity of the air, at the Blue Hill Meteorological Observatory, near Boston. He repeated these experiments 1891 and 1892, and succeeded in getting on a modern electrometer a record of the electricity collected by a kite. He also repeated Franklin's experiment while a distant thunderstorm was passing, obtaining sparks and voltage suf-

EDDY MALAY KITE (REAR VIEW).

ficient to illumine an incandescent lamp. In 1898, after experimenting for about three years in Washington, the U. S. Weather Bureau established sixteen kite stations, separated from each other by several hundred miles, and covering the area from the Atlantic coast to the Mississippi River, and from Tennessee to the Canadian boundary, the object being to obtain simultaneous records at considerable heights in the air and to construct charts of the weather conditions in the upper air for purposes of forecasting.

Kittatin'ny, or **Blue Moun'tain,** chain which takes its rise near Shawangunk, Ulster Co., N. Y., passes SW. through a corner of New Jersey, crosses the Delaware at the Water Gap, trends WSW. through Pennsylvania, crosses the Susquehanna a few miles above Harrisburg, and the Potomac near Berkeley Springs, and continues with gradually lessening altitude through Virginia, N. Carolina, and Tennessee into Alabama, thus having a total length of more than 800 m. In average elevation and bulk the Blue Mountain range exceeds the Blue Ridge.

Kit'ti-wake, small gull (*Rissa tridactyla*) found abundantly on both sides of the N. Atlantic and Pacific, the Pacific birds being accorded the rank of a subspecies, owing to the fact that the hind toe is rudimentary or absent. This species assembles in great numbers at some of its breeding places, one favorite locality, near North Cape, on the coast of Norway, containing millions.

Kit'to, John, 1804–54; English biblical scholar; b. Plymouth; was incurably deaf; lived in his childhood in the Plymouth workhouse, but procured a college education, and resided some years in Malta and Bagdad; afterwards assisted Charles Knight in preparing serials for the "Library of Useful Knowledge," and in the compilation of other works. His principal works are the "Pictorial Bible," "Pictorial History of Palestine," "Cyclopædia

of Biblical Literature," "Physical Geography of the Holy Land," and "Daily Bible Illustrations."

Kiukiang (kē-ō-kē-äng'), city of China, province of Kiangsi; opened, 1861, to foreign trade and residence; on the Yangtze, 445 m. from Shanghai. Pop. (1904) est. 36,000. The foreign settlement lies to the W. of the city, along the bank of the Yangtze, and is bounded on the W. by a small river called the P'un. The chief imports are cotton and woolen goods, metals, and opium; and the chief exports, chinaware, grass cloth, hemp, paper, rice, tobacco, and tea. Pop. (1907) 36,000.

Kiushu, or **Kyushu** (kyō-shō'), literally, "nine provinces," farthest S. of the four great islands of Japan; separated from the largest island by the Straits of Shimonoseki; covers an area of 13,772 sq. m., and is remarkable for the broken nature of its coast line. In Kiushu were the powerful daimiates of Satsuma, Hizen, Chikugo, and Higo. On its NW. shores are the productive coal mines of Takashima and Karatsu. There are five special ports of export, opened 1889, Moji, Hakata, Karatsu, Misumi, Kuchinotsu.

Kiwi (kē'wē), or **Kiwi-ki'wi**. See APTERYX.

Klapka (klōp'kōh), **György**, 1820–92; Hungarian military officer; b. Temesvar; after serving in the Austrian army, became, on the revolt of Hungary, commander of an army corps of his countrymen, and was made Minister of War by Kossuth; was besieged in the fortress of Komoru by the Austrian general Haynau and forced to surrender; spent many years in exile; entered the German service; became a citizen of Switzerland and a member of the Federal Council; later served in the Austro-Hungarian army, and, 1837, in that of Turkey. Author of "Memoirs of the War of Independence in Hungary," "The War in the East," etc.

Klaproth (kläp'rōt), **Martin Heinrich**, 1743–1817; German chemist; professor in Univ. of Berlin; discoverer of the metals zirconium, titanium, and uranium, the sulphate of strontium, and the molybdate of lead.

Klausenburg (klow'zän-bōrkh), Hun. KOLOSVAR, capital of Transylvania, formerly a separate principality of the Austrian Empire, now united to Hungary; 225 m. SE. of Budapest; has a university, a Unitarian college, and manufactories of porcelain. Pop. (1900) 49,295.

Kléber (klā-bār'), **Jean Baptiste**, 1753–1800; French military officer; b. Strassburg; volunteered as a private soldier, 1792; rose to the highest rank; fought the Royalists of Vendée; won the battles of Altenkirchen and Friedburg, 1795; became general in chief in Egypt, and vanquished the Turks at Heliopolis; again subdued Egypt, which had revolted, 1800; was murdered at Cairo by a fanatical Moslem.

Klein (klīn), **Julius Leopold**, 1810–76; German dramatist; b. Miskolecz, Hungary; settled in Berlin; published many dramas, including "Maria de Medici," "Zenobia," "Voltaire," "Richelieu," and a notable "History of the Drama."

Kleom'enes. See CLEOMENES.

Kle'on. See CLEON.

Kling'er, **Friedrich Maximilian von**, 1753–1831; German author; b. Frankfort; wrote dramas for the Seyler band of strolling actors; entered the Austrian army, 1778; went to St. Petersburg, 1780; rose there to the highest positions in the military administration. While in Frankfort, Klinger belonged to the circle of young writers who gathered around Goethe, and his drama, "Storm and Stress," gave, in fact, the name to the new literary era inaugurated by Herder and Goethe.

Klon'dike, The, rich gold region in Yukon Territory, Canada, and small neighboring parts of Alaska. The name is derived from the Indian word "Trondik," meaning Hammer Creek, so called from the fact that the Indians, to catch salmon, erected barriers across the mouth of the creek by hammering sticks into the ground. Gold was discovered on Bonanza Creek, a tributary of the Klondike River which flows into the Yukon, August 16, 1896. This creek and its branch, the Eldorado, yielded $2,000,000 the first season, and the entire output of the Klondike, 1897–98, was about $10,000,000. Most of the metal is placer gold, collected at bedrock, though some of it is distributed through the soil that covers the solid rock. It is obtained both by dredging and quartz mining, though at first the methods were very primitive. The annual yield is over $20,000,000. The territory has little agricultural value, though cabbages, lettuce, etc., are raised successfully. The winters are severe, but the climate in summer is hot and humid. Dawson, on the Yukon, is the chief settlement, and the source of supplies for the territory.

Klop'stock, **Friedrich Gottlieb**, 1724–1803; German poet; b. Quedlinburg; after living at Jena and Leipzig, resided, 1751–71, at Copenhagen; pensioned by the King of Denmark in order that he might finish his great epic, "Messiah," three cantos of which had been published, 1748. The last five cantos appeared, 1773. In 1771 Klopstock settled at Hamburg, where he died. His other works comprise odes, tragedies, biblical dramas, and hymns.

Kneipp (nīp), **Sebastian**, 1821–97; German priest; b. Stefansried, Bavaria; was a weaver until 1848; while preparing for the Catholic priesthood studied medicine also, mainly with a view to curing himself of a consumptive tendency. He went to Woerishofen, Swabia, after his admission to the priesthood, and there accomplished many cures by cold-water treatment. The publication of "My Water Cure," together with his successes in treatment, led to the establishment of the Kneipp Verein, accommodating many patients and supported by charitable contributions. Father Kneipp's methods consist of the application of sunshine, fresh air, and water, the most striking feature being a walk in the early morning barefooted through the dew or snow.

Kneller (nēl'ēr), **Sir Godfrey**, 1648–1723; German-English portrait painter; b. Lubeck; studied for a time with Rembrandt; went to

London, 1674, and succeeded Peter Lely as court painter, which position he held under James II and William. William III made him a knight, Queen Anne appointed him Gentleman of the Bedchamber, George I conferred a baronetcy on him. At the time of his death he had 500 portraits in hand. His fame greatly exceeds his merit. JOHN ZACHARIAH, his younger brother, also practiced his art in England.

Knife. See CUTLERY.

Knight, man at arms, serving on horseback and pledged to perform certain honorable services, such as those performed by the equites of Rome. Knighthood, as associated with chivalry, is of Northern origin. A certain value of land, called in England a "knight's fee," and in Normandy "*fief de haubert*," was allotted to a tenant, who in return bound himself to follow his lord to battle. Thus in its earlier days knighthood was but a part of the feudal system, and could boast little of that nobleness which afterwards distinguished it. Its real history begins with the crusades. The younger sons of noble families enlisted under the standards of wealthy lords, in whose service they might hope to gain such honor, and even riches, as would raise them to an equality with their elder brothers. Every knight was permitted to carry a pennon or pointed flag upon his lance, but as a reward for gallantry or military prowess he was honored with the privilege of bearing the banner or square flag, and in this case was known as a bannaret, while knights who had not won this distinction were termed bachelors. The bannerets or knights banneret held a higher rank in the feudal army and commanded larger divisions than the bachelors. During the crusades knighthood became blended and almost identified with religion. Every knight pledged himself to aid in recovering the Holy Land. Warriors who died while wearing the cross were assured by priest and pope of a speedy entrance into paradise; chivalry was held to be little lower than the Church itself, and the two were united in the persons of those monk soldiers who, while under vows of poverty, chastity, and obedience, were also foremost and fiercest in battle. See CHIVALRY; TOURNAMENT.

A KNIGHT CRUSADER.

Knights of Colum'bus, fraternal order, members of which must be communicants of the Roman Catholic Church; founded February 2, 1882, by the late Rev. P. J. McGivney, at New Haven, Conn., and incorporated by the General Assembly of that state.

Knights of La'bor, association formed in Philadelphia in 1869, having for its object the promotion of the interests of the laboring classes. See TRADES-UNIONS.

Knights of Pyth'ias, fraternal association founded February 19, 1864, at Washington, D. C., by Justus H. Rathbone. Intended solely to disseminate the principles of friendship, charity, and benevolence; nothing of a sectarian or political character is permitted within it. Toleration in religion, obedience to law, and loyalty to government are its cardinal principles. There are three degrees, called ranks—page, esquire, knight. All business is transacted in the rank of knight. The object of the endowment rank is to furnish economical life insurance.

Knights Tem'plars, or **Poor Sol'diers of the Tem'ple of Sol'omon,** military and religious order founded, 1118 or 1119, by nine French gentlemen at Jerusalem for the defense of the Holy Sepulcher and of pilgrims. Their quarters were in the palace of the Latin kings, known also as Solomon's Temple, whence they derived their name. Their rule, prepared in the Council of Troyes, and confirmed by the pope, 1128, bound them by vows of poverty, chastity, and severe religious exercises. In 1146 the red-cross banner became their distinction. For a century and a half their history was almost completely identified with the crusades, in which their piety and deeds of valor won them fame throughout Europe. On the loss of the Holy Land (1291) they occupied Cyprus. Their wealth and luxury rapidly increased, and were the occasion of their final overthrow. This was accomplished by the conjoined efforts of Philip IV of France and Pope Clement V. Their grand master, De Molay, was burned alive in 1314, and at the Council of Vienne in 1312 numbers of them suffered the same fate.

Knit'ting Machine'. In hand knitting the thread is passed in a series of loops on the needles, each loop has passed through it another loop, and the process repeated till the fabric is complete. The mechanical stocking frame was invented by William Lee of Nottinghamshire, 1589. It had as many hooked needles as there were loops in the breadth of the web, and these alternately formed and gave off the loops. Between the needles were "sinkers," thin plates, moving freely on one side, but attached to a bar on the other. The loose sinkers make the loops, the sinkers on the bar close the hooks on the needles so that the loops can be taken off them. The addition of a second line of needles, 1758, made seamed, or ribbed, knitting possible. In 1816 a circular machine made a tube-shaped web. In the modern form, the needle has a hinged latch which folds back so that the thread may be taken up. The machines are so perfectly automatic that one operator can tend six of them.

Knot, twisting or entwining of one or more pieces of cord, or of the strands of a rope, or the looping of such cord around some other substance in such a way as not easily to come apart or to be disentangled. Knots are of

especial importance on shipboard, and much skill is required in the adjustment of some of them. The number in use among seamen is

Reef Knot.

great; among the more common are reef knot, figure-of-eight knot, bowline knot, running bowline, Matthew Walker knot, man-rope knot,

Figure-of-Eight Knot.

Bowline Knot.

and rope-yarn knot. In reference to the speed of a ship a knot is one of the divisions of a log line, and receives its name from the knots

Running Bowline Knot.

Man-Rope Knot.

used in marking the line. Each of these divisions bears the same relation to a nautical mile that half a minute does to an hour when the half-minute sand glass is used. Each knot or division represents a nautical mile. Hence when a vessel is said to make 10 knots it signifies that the speed is 10 nautical miles, or 11½ statute miles per hour, one nautical mile

Matthew Walker Knot.

Rope-Yarn Knot.

being equal to 1.15 statute miles. In point of fact the length of a nautical mile varies with the latitude. The U. S. Hydrographic Office, however, and the U. S. Coast and Geodetic Survey have adopted 6,080.27 ft. as its constant length. That adopted by the British Admiralty is 6,080 ft.

Knowles (nōlz), **Sheridan,** 1784–1862; English dramatist; b. Cork, Ireland. In 1806 he made his first appearance as an actor at Dublin, and afterwards taught elocution at Belfast and Glasgow. His "Caius Gracchus" was first performed at Belfast, 1815; "Virginius" at London (Drury Lane), 1820, and he was thenceforward recognized as one of the chief dramatic authors of the United Kingdom. He produced fourteen other dramas, including "William Tell," "The Hunchback," "The Love Chase," "Woman's Wit." In 1845 he abandoned the stage from conscientious scruples, and in 1852 joined the Baptist denomination, and became a preacher distinguished for religious fervor.

Know'-Nothings, name applied to a secret political society in the U. S., organized 1853, which appeared in the elections of 1854 as a well-disciplined party, and the next year polled a large vote in several states, North and South. The cardinal idea of the society was opposition to foreign citizenship. In the presidential campaign of 1856 the Know-Nothings appeared as the "American party," presenting Millard Fillmore as its candidate, who carried only the State of Maryland with its eight votes in the electoral college. The growth of the slavery issue extinguished the question of foreign citizenship, and the party speedily died out.

Knox, Henry, 1750–1806; American military officer; b. Boston, Mass.; was present at the

battle of Bunker Hill, acting as aid to Maj. Gen. Artemus Ward; was afterwards placed in command of the artillery in New York, took a brilliant part in the battles of Trenton and Princeton, and was thereupon elected by Congress brigadier general of artillery, and sent to New England to raise a battalion of that arm. In the battles of Brandywine, Germantown, and Monmouth the artillery under Knox bore a leading part. He was at the battle of Yorktown, after which he was made major general. In 1785 he succeeded Gen. Lincoln as Secretary of War and of the Navy, retaining that post for six years.

Knox, John, 1505–72; Scottish reformer; b. Gifford, East Lothian; was ordained priest before 1530; avowed Protestant convictions, 1542; withdrew from his position as teacher at St. Andrews, and sought shelter at Longnidry, under the protection of Hugh Douglas. After the assassination of Cardinal Beaton, he removed to the castle at St. Andrews, where, 1547, he was taken prisoner by the French, and condemned to the galleys on the charge of being concerned in the cardinal's death. Liberated, 1544, he went to England, and, though not ordained as a Protestant minister, was sent by Cranmer to preach at Berwick. King Edward appointed him a royal chaplain, and offered him a bishopric, which he declined. On Mary's accession he removed to France, thence to Switzerland, and soon took charge of a church of English exiles at Frankfort on the Main. In 1554 he published "Faithful Admonition unto the Professors of God's Truth in England." For two years he served as pastor of the English church at Geneva, and there published his "First Blast against the Monstrous Regiment of Women" (Mary of England, Mary of Guise, and the Princess Mary, afterwards Queen of Scotland). Knox returned to Scotland, 1559, and was at once proclaimed a rebel and an outlaw, but was soon aided by the Protestant party. His friends carried all before them, removing the emblems of Roman Catholic worship from the churches and overthrowing the monasteries with an iconoclastic violence for which probably Knox was not responsible. Knox was formally ordained at Edinburgh, 1560. In that year the Confession of Faith was adopted by Parliament, the Reformation established, and the first Assembly of the Kirk held. In 1561 Queen Mary of Scotland returned from France. To her Knox was loyal, but his loyalty largely manifested itself in what he regarded as faithful rebuke and restraining influence. He was stricken with apoplexy, 1870, but continued to preach and publish till a few days before his death at Edinburgh.

Ko'be, treaty port of Japan; on the S. part of the island of Hondo, 22 m. from Osaka, on the W. shore of the Gulf of Osaka; adjoins on the NE. the city of Hiogo, with which it really forms one city. Kobe was founded in 1868; is the seat of a large foreign trade; has extensive docks and shipyards. Pop. (with Hiogo), 1904, 285,002.

Knox'ville, capital of Knox Co., Tenn.; on the Tennessee River, navigable for steamboats to this point; 165 m. E. of Nashville. It is one of the most important inland cities of the South, is in a rich coal, iron, and marble region, and is a large wholesale trade center. It contains the Univ. of Tennessee, Knoxville College, Tennessee Deaf and Dumb School, E. Tennessee Asylum for the Insane, U. S. Govt. building, courthouse, the Lawson McGhee Memorial Library, and several libraries. The manufactures include cotton, woolen, marble, flour, lumber, and rolling mills, foundries, car and car-wheel factories, tanneries, and furniture, soap, stove, and wagon factories. Pop. (1906) 36,015.

Knut, or Knud (knōt). See CANUTE.

Ko'bold, in German legends, a kind of elf which in some places was believed to be attached to some particular house or place. In general, the kobolds were beneficent, but some were malicious. They particularly haunted the mines; they were little, decrepit old men and women, dressed generally in miners' clothes. They heaped up precious stones and valuable metals; and, though they dreaded to be seen by men, they were fond of doing mankind favors in secret.

Koch (kōch), **Robert,** 1843– ; German bacteriologist; b. Clausthal, Hanover; became an assistant in the General Hospital at Hamburg, 1866; subsequently practiced medicine in Langenhagen, Racknitz, and Wollstein; removed to Berlin, 1880; announced his discovery of the tubercle bacillus, 1882; same year published a method of preventive inoculation against anthrax. He was appointed director of the German Cholera Commission, 1883, and discovered the cholera spirillum, or comma bacillus; appointed Prof. of the Medical Faculty of the Univ. of Berlin, 1885; announced, 1890, the discovery of tuberculin, a substance which checked the growth of the tubercle bacillus; became honorary professor and director of the New Institute for Infectious Diseases, 1891.

Kock (kōk), **Charles Paul de,** 1794–1871; French novelist; b. Passy; began life as a banker's clerk, but soon turned to writing. His first novel, "Georgette" (1820), found few buyers, but with his second, "Gustave" (1821), his popularity began. For twenty years few novelists had a wider reputation than he. The novels of the latter part of his life are considered inferior. Among those of his best years are "Jacques," "Monsieur Dupont," "Le Barbier de Paris," "Mœurs Parisiennes," "L'Homme aux Trois Culottes." His son, Henri de Kock (1821–92) was also a novelist and a playwright.

Koda'ma, Gentaro (Baron), 1855–1906; Japanese military officer; was educated in Japan and the U. S.; entered the army, 1872; major general, 1892; Minister of War and Governor of Formosa, 1900–2; lieutenant general, 1904; vice chief of the general staff and author of the plans for the war against Russia; and chief of staff to Marshal Oyama in the operations in Manchuria; was called "the brain of Japan's army."

Kodiak (kōd-yăk'), an island of Alaska; about 100 m. long by 60 m. broad. Its coast is very irregular, being much cut up by bays and fiords, and it has many smaller islands about it. The island is rocky, and has an extensive low forest growth. The aborigines are apparently the Kadiaks or Kaniagmuts, a people like the Aleuts, but among the inhabitants are the latter and some representatives of continental tribes. The island was discovered, 1741, by Bering; taken possession of by a company of Russian merchants, 1768; acquired by another company, the Russian-American, 1799; and became a part of the U. S. by the cession of 1867.

Koh-i-noor (kō-I-nōr'), famous diamond which for many centuries was in the possession of the monarchs of India, and now is owned by Edward VII. Successive cuttings reduced its weight from 900 carats to 792, then to 279, next to 186.6, and at last, in 1852, to 102.75. Its form is rose cut, and it is valued at about $600,000.

Kokan (kō-kăn'), or **Kokand** (kō-kănd'). See KHOKAND.

Koko-nor (kō-kō-nōr'), or **Kuku-nor'**, elevated mountainous region of Mongolia, E. of Chinese Turkestan, NE. of Tibet, in which it is sometimes included, and S. of the Chinese province of Kansu, which separates it from the rest of Mongolia. Its N. boundary is the Nan-shan, an E. extension of Altin-tagh, and its S. the Bayankhara range; area, 120,000 sq. m.; pop. abt. 170,000, mostly Tangutans. Near its E. extremity is an island with a circuit of 6 m., which is said to have been dropped from the skies by a gigantic bird, upon the spot from which the waters at one time issued in such quantity that they threatened to submerge the world.

Ko'la, peninsula in N. Russia between the White Sea and Arctic Ocean. The Kola River and a series of lakes almost separate it from the mainland. It is rocky and full of rivers and lakes, 1,145 of the latter being known. On the S. coast are a few Russian villages.

Kola Nut. See COLA.

Kolar', district and town of Mysore, S. India; district on the E. edge of the Mysore table-land, adjoining the E. Ghats; area, 3,059 sq. m.; pop. 723,000; town, 40 m. ENE. of Bangalore; silkworms are raised in considerable quantities near the town; pop. 12,000.

Kolhapur', independent state under British protection, in the presidency of Bombay, partly in the W. Ghats, partly on the table-land of Deccan, bordering on the Kistna; area, 2,855 sq. m.; pop. 910,011; capital, Kolhapur; pop. (1901) 53,373.

Kolguef (kōl-gō'yĕf). See KALGUEV.

Kol'lar, Jan, 1793-1852; Slavic scholar; b. Mosovce, Hungary; became Protestant minister at Pest, 1819, and, 1849, Prof. of Archæology at Vienna; was the most zealous, if not the first, advocate of Panslavism, and reflected his views in his poetical works, written mostly in Czechic, and in those on the antiquities of the Slavs; most celebrated work, "The Daughter of Glory."

Köln, German name of COLOGNE (*q.v.*).

Kom (kōm), town in province of Irak-Ajami, Persia; was destroyed by the Afghans, 1,722, but is at present flourishing. In sanctity it ranks second only to Meshhed. It contains the shrine of Masuma Fatima, inclosing not only her remains, but also those of 444 other saints. The shrine is annually visited by thousands of devout pilgrims, and the city is, like Kerbela, a favorite place of interment for the faithful. Pop. abt. 30,000.

Komorn (kō'mōrn). See COMORN.

Komu'ra, Jutaro (Baron), 1854- ; Japanese diplomatist; b. province of Hiuga; graduated at the Imperial Univ. in Tokyo and at the law school of Harvard Univ. (1878); entered the Ministry of Justice; appointed judge; became chief translator in the Foreign Office; Minister to China, 1894; governor of captured Manchurian province of Antung; Minister to Korea, the U. S., and Russia successively; Minister of Foreign Affairs; chief Japanese plenipotentiary at the Portsmouth (N. H.) Peace Conference, 1905; subsequently active in bringing about the Anglo-Japanese alliance; appointed Ambassador in London, 1906.

Kon'go, second largest river in Africa, the knowledge of which (not yet complete) is due to modern explorations, especially those of Stanley. It begins in the Chambezi River, which rises in about lat. 9° S., lon. 32° E., in the mountains S. of Lake Leopold, or Hikwa, between Tanganyika and Nyassa. This flows SW., and is lost in Lake Bangweolo, or Bemba. Beyond this lake it reappears as the Luapula, which flows into Lake Moero. Passing through this, it reappears as the Luvua, and still flowing N. receives in its course the great Lualaba River, and takes its name. From about lat. 4° S. its course has been explored, and it is known as the Kongo. From this point it is a noble stream, full of islands, and sometimes dividing into two or more parts. At the equator there is a series of falls and cataracts called the Stanley Falls. From this place it passes NE. to lat. 2° N., then SW. to Stanley Pool (Leopoldville), in lat. 4° S., a distance of 1,000 m. or more, all navigable, and in this distance it receives the four great tributaries—the Lubilash (or Lomami) from the S., the Novelle (called Aruwimi at its mouth) from the E., the Ubangi (or Mobangi) from the N., and the Kwa (or Kassai) from the E. From Stanley Pool to Vivi, a distance of 200 m. or more, it is not navigable. From Vivi to the mouth, 90 m., navigation is free. There is no delta; in this the Kongo differs from the other great African rivers—the Nile, Niger, and Zambesi. The total length has been estimated at 2,900 m., of which not more than half is navigable. The whole basin has an area of about 1,600,000 sq. m.

Kongo, Free, or Independ'ent State, state in central Africa, embracing two thirds of the Kongo River basin, and including a small strip along the lower Kongo from the coast. From

lon. 14° E. the boundary follows the Kongo to the mouth of the Ubangi; then the Ubangi and Mbomu to 30° E. long.; thence S. to Lake Bangweolo, or Bemba; thence W. to the Kassai, in 24° E. lon.; then along the Kassai to 7° S. lat.; then W. to the Kwango, in about 8° S., down which the boundary follows to 5° 50′ S.; thence W. to the Kongo, and down that stream to its mouth. The state has access to the Nile at the Lado *enclave*, the W. boundary of which is 30° E. long. This enormous area (909,000 sq. m.) is varied, having only the two common characteristics of being tropical and of being included in the basin of a single river. The surface is mountainous in part, especially in the E. and SE., and that portion not mountainous has an elevation of 900–1,500 ft. Much of the country is covered with dense forests. The average temperature ranges between 78° and 82°.

The native population, of Bantu origin, is estimated at 20,000,000. The European population, 1908, numbered 2,943. The local capital is Boma, 50 m. from the river mouth. Civilized control extends over most of the larger rivers; in other parts of the state the wild tribes are entirely uncontrolled and, to some extent, unvisited. One of the purposes of the original formation of the state was the suppression of the slave trade, and this has been fairly accomplished.

The International Association of the Kongo, formed for the purpose of trade and exploration, sent Stanley up the great river, 1879. He made over 400 treaties with native chiefs, who thereby conveyed their sovereignty to the International Association, which then appealed to the powers to enable it to combine these many little sovereignties into one independent state. The U. S., 1884, recognized the International Association as a sovereign and independent power under the title of the Kongo Free State. Within a year the other great powers followed this example. The character of the new state was constituted and defined by the International Kongo Conference at Berlin, 1885. It was declared neutral and free to the trade of all nations, though the powers reserved for twenty years the right to decide as to the freedom of imports from taxation. The free navigation of the Kongo and its affluents was provided for under an international commission. Religious freedom was proclaimed. Equality of treatment was promised to all settlers of whatever nationality. The slave trade and slavery were to be assailed, the education and civilization of the natives attempted. In April, 1885, Leopold II, King of the Belgians, became sovereign of the new state, but it has declared itself perpetually neutral, in accordance with a provision of the General Act of Berlin. The king bequeathed his rights to Belgium, 1889; the territories of the state were declared inalienable, 1890; and a convention between Belgium and the Independent State reserved to the former the right of annexing the latter after a period of ten years. This right was continued under an act of 1901.

The annexation of the state to Belgium was provided for by treaty of November 28, 1907, and was approved by the Belgian Legislature and the king, October 18, 1908. The Minister for the Colonies is appointed by the king and is a member of the Council of Ministers and of the Colonial Council. The king is represented in the colony by a governor general. There are fourteen administrative divisions; an armed force of nearly 20,000 blacks, commanded by white officers; a considerable fleet of steam vessels on the lower and upper Kongo; regular steamship communication with Europe; membership in the International Postal Union; and a good beginning of an extensive railway system. The principal articles of export are palm oil, rubber, ivory, orchilla, copal, cocoa, coffee, crude gold, tin, and ranewood; value of imports, over 22,500,000 fr.; exports, over 23,000,000 fr. The ports are Boma and Banana.

Kongo, French, region of W. central Africa, extending along the Atlantic coast between the German Kamerun colony and the Kongo Independent State, with the exception of the Spanish territory on the coast from the Mouni River, on 1° N. lat., to the German Kamerun, and inland to the meridian of 11° 20′ E. of Greenwich and the Kabinda region, which is Portuguese. Inland it is bounded by the Kongo and Ubangi rivers, on the E. by the Anglo-Egyptian provinces of Bahr-el-Ghazal and Darfur; to the N. it stretches a little beyond Lake Chad, taking in the State of Kanem; area, about 669,000 sq. m.; pop. 8,000,000–15,000,000, of negro and other races. The French Kongo is divided into four circumscriptions, which form three colonies: the Gaboon (capital, Libreville), the Middle Kongo (capital, Brazzaville), and the Ubangi-Shari-Chad (capital, Fort-de-Possel).

The Middle Kongo has an administrator in chief; the other colonies have each a lieutenant governor; all three have financial and administrative autonomy, and each has an administrative council. The chief highways of trade are the Gaboon, Ogone, Kongo, and Ubangi rivers, while the Sanga is of the highest importance as a waterway N. and S. The mineral resources include gold, copper, and iron. The chief exports are rubber, ivory, various woods, palm oil, palm kernels, coffee, cocoa, kola nuts, and piassava.

Ko'nia. See ICONIUM.

König (kö'nĭkh), **Friedrich,** 1775–1833; German inventor; b. Eisleben; invented the steam printing press; printed a sheet of the *Annual Register* in London, 1811, and a number of the *Times*, 1814, these being the first practical printings by the steam press.

Königgrätz (kö'nĕkh-rĕts), fortified town of Bohemia; on the Elbe. The Austrians under Benedek were completely defeated here by the Prussians under Moltke, July 3, 1866. The action is sometimes known as the battle of Sadowa, from a village of that name in the vicinity. Pop. (1900) 9,773.

Königsberg (kö'nĭkhs-bĕrkh), capital of the province of Königsberg, Prussia, and a fortress of first rank; 20 m. from the Baltic, on the Pregel, whose two arms unite within the city. It is the seat of a university, of the provincial

government, of the staff of the First Army Corps, and has a numerous garrison. It consists of three former towns, Alstadt, Löbenicht, and Kneiphof, which, 1724, were united into one city. Among notable buildings are the palace, the cathedral, the old university building, Collegium Albertinum, founded 1544; the new university building, the museum, the royal library, and the observatory. Excellent scientific and benevolent institutions are the botanical gardens, the zoölogical museum, the seminary, three gymnasiums, a mercantile school, an academy of art, asylums for the deaf and dumb, for the blind, lunatics, and orphans, and several hospitals. The manufacturing industry is considerable. Iron foundries, machine shops, breweries, and dye works are in operation. Iron goods, chemicals, soap, paper hangings, leather, and tobacco are manufactured. Königsberg was built by the Teutonic order of Knights, 1255, as a fortress against the pagan Samländer, and rose to importance through its corn trade. Abt. 1523 it became the capital of the duchy of Prussia. Pop. (1905) 223,770.

Koo'doo, large African antelope (*Strepsiceros kudu*) having erect, spirally twisted horns, which sometimes attain a length of over 3 ft. The color is grayish brown, slightly reddish in the females and young, and marked on the sides with eight or ten vertical white stripes. The koodoo ranges from Abyssinia to Cape Colony, but in the S. portions it has been practically exterminated by hunters.

Koordistan (kōr-dĭs-tăn'). See KURDISTAN.

Koorile (kō'rĭl) **Is'lands.** See KURILES.

Kooria-Mooria (kō'rē-ä-mō'rē-ä) **Is'lands.** See KURIA-MURIA ISLANDS.

Koornhert (kōrn'hĕrt), **Diedrik.** See CORNHERT.

Kootenai (kōt'ē-nā), river of British Columbia and affluent of the Columbia River, next to Clarke River the largest of its branches; rises in the heart of the Rocky Mountains, flows S. through a narrow valley to Montana, turns W. into Idaho, then N. into the long and slender Kootenai Lake. It leaves this lake on its W. side, and after a short course joins the Columbia in lat. 49° 15′ N.; total length about 300 m.

Ko'peck. See COPECK.

Koper'nigk. See COPERNICUS.

Kopisch (kō'pĭsh), **August,** 1799–1853; German poet; b. Breslau; studied art at Dresden, Prague, and Vienna, but was hindered from painting by an accident to his hand; went to Italy, where he studied popular poetry, and where he became the discoverer of the Blue Grotto, or the Grotto of the Nymphs. In 1836 he published a volume of poems which established his reputation as a writer of exquisitely humorous and naïve popular poetry.

Kopitar (kō'pē-tär), **Bartholomäus,** 1780–1844, Slavic philologist; b. Carniola; was employed in the imperial library at Vienna, and became its first director shortly before his death. His writings brought light into the more obscure parts of Slavic ethnology, philology, and literature.

Kopp (kōp), **Joseph Eutych,** 1793–1866; Swiss historian; b. Lucerne; was Prof. of Greek at Lucerne, 1819–41; became a member of the Council of State and President of the Board of Education, and was removed (1845) for opposing the restoration of the Jesuits. He disproved the story of William Tell.

Kopparberg (kōp-pär-bĕrg'), political division of Sweden; on both sides of the Dal River, and comprising those regions which formerly were so celebrated in the history of the country under the name of Dalarne. The inhabitants form one of the finest types of the Scandinavian race.

Köppen (kōp'ĕn), **Friedrich,** 1775–1858; German philosopher; b. Lubeck; preached in Bremen, 1804–7, and was professor at Landshut until the dissolution of that university, 1826, and subsequently at Erlangen. He wrote on the systems of Kant, Fichte, and Schelling, adopted in general the opinions of Jacobi, and in his later works attempted to demonstrate the compatibility of critical philosophy and Christianity, basing faith and morality on personal consciousness.

Ko'ran (or with the definite article, AL KORAN, "the reading" or "that which should be read"), sacred book of Islam and the earliest surviving monument of Arabic prose. It contains Mohammed's utterances made, as he said, by command of Allah. These extend over the whole space of his prophetic life (610–632 A.D.), and give a picture of his religious history. The book consists of 114 discourses, called *suras*, of varying length and matter; arranged, not chronologically, or according to subject-matter, but in order of length, beginning with the longest, except that a short prayer (the Mohammedan *pater noster*) stands first. The subject-matter of the Koran embraces announcements of doctrine (unity of God, the day of judgment, divine mission of Mohammed), pictures of the delights of paradise and the tortures of hell, inculcation of duties religious (prayer, pilgrimage to Mecca), moral (honesty, justice, temperance, chastity, forgiveness, kindness to orphans and widows, almsgiving), ritual (ablutions, fasting), narratives of ancient times, taken from the Old and New Testaments and from Jewish, Christian, and Arabian tradition, regulations respecting civil affairs (marriage and divorce, inheritance, division of the spoils of war), polemic against Jews and Christians.

Kordofan', one of the twelve provinces of the Anglo-Egyptian Sudan; bounded on the E. by Sennar, from which it is separated by the White Nile, and on the W. by Darfur; estimated area, 100,000 sq. m.; est. pop. 300,000; capital, El-Obeid. The aborigines belong to the Nuba stock, and the population includes a large number of nomad Arabs. The chief exports are gums, hides, ivory, gold, and ostrich feathers. The country was conquered by the Sultan of Sennar at the end of the eighteenth century; then by the Sultan of Darfur; was annexed to Egypt, 1821; lost to the Egyptians

by the Mahdi revolt, 1883; and on the organization of the Anglo-Egyptian Sudan, 1898, was made one of its provinces.

Korea (kō-rē'ä), country of E. Asia, occupying a portion of the mainland and the peninsula which juts out therefrom in a SE. direction toward Japan; area (including islands) about 84,420 sq. m., of which one third is continental and two thirds peninsular and insular; pop. (1907) 9,782,000; capital, Seoul. On the E. it is washed by the Sea of Japan, on the S. and W. by the Yellow Sea. On the N. and NW. it is separated from Manchuria by the Am-nok-kang and Tuman rivers and the Tai-paik-san Mountain.

The country is everywhere mountainous. The orographic system consists of a main axis of elevation, which, starting from the Tai-paik-san, or "Great White Mountain," of Manchuria, skirts the E. seaboard, and is intersected by several ridges which run NE. and SW. parallel with the highlands of Manchuria and Mongolia, and are apparently continuations of the parallel ridges of the "Sinian" or Chinese system. The highest peaks are Hien-Fūng (8,200 ft.), near the N. shore of Broughton Bay; Tsiong-yang (6,500), near lat. 37° N., and Han-ra-san (6,700), on the island of Quelpaert. From the main axis the surface falls off abruptly on the E., while to the W. the slope is more gradual.

The E. coast is comparatively destitute of inlets, but the S. and W. are deeply indented and are fringed with numerous islands; the largest are Quelpaert (40 m. by 17) on the S. and Kang-hwa on the W. coast. With the exception of the Tuman and the Nak-tong, all the rivers flow W. or SW. The Am-nok is navigable for seagoing junks for 30 m., and by boats for 145 m. more, or as far as Wi-won. The Tai-dong is navigable by boats to Phyöng-yang, 75 m.; the Han-Kang for 80 m., as far as Seoul, the capital; the Nak-tong, which falls into the Straits of Korea near the port of Fusan, is navigable for 140 m. by boats drawing 4½ ft.

The climate resembles that of corresponding latitudes in China, the thermometer falling in some places as low as —7° or —8°, and rising in summer to 90° or 95° F. The Han River (in lat. 37° N.) is frozen over for about five months every winter. The mineral wealth of Korea is great. Gold and silver are found, the former being an important article of export. There are iron mines, and coal is abundant and is worked in the neighborhood of Phyöng-yang. There are copper mines in several places, and rock salt is also found. In the N. the chief crops are barley, millet, and oats; in the S., rice, wheat, beans, grain, and tobacco and cotton. The chief industries are paper making, mat weaving, and manufactures of silk, brass and copper ware, and split-bamboo blinds and hats for native use. These last are made chiefly on the island of Quelpaert. The principal exports are beans and peas, ginseng, cowhides, and rice; principal imports, cotton and woolen goods, metals, building materials, clothing, grasscloth, kerosene oil, railway plant and material, silk piece goods, tobacco, etc., timber. Seoul and the ports of Kunsan, Masampo, Songechin, Chemulpo, Fusan, Monsan (Gensan), Chinnampo, Mokpo, Wiju, and Yongampo are open to foreign trade and commerce; value, imports (1907), $20,365,000; exports, $8,207,000. There are several railway lines, all belonging to the Japanese Govt. The people are similar in their habits and customs to the Chinese. The language is intermediate between Mongolo-Tartar and Japanese, and an alphabetic system of writing is used. Buddhism was early introduced from China and spread thence to Japan. It is still found in the country, but it has little influence on the people, who practice the Confucian morality and ancestral worship and many other superstitions. There are about 2,000 Roman Catholics and 6,000 Protestants. The chief schools at the capital are conducted by missionaries, and there are also a number of schools in which instruction is given in the principal modern languages by foreign teachers.

Little is known of the country before the third century A.D., when Jingo-kogo made war on it and exacted tribute from three of its petty principalities. One of these, Korai, afterwards became dominant (in the eleventh century), but was itself overturned, 1392, when one Li-tan founded the dynasty which now rules and gives the country its name—Cho-sōn. Until 1895 Korea was tributary to China, but autonomous, the king being absolute master of his subjects. In 1876 Japan negotiated a treaty of trade, and, 1882–86, other powers negotiated similar treaties, and the ports of Fusan, Gensan, and Chemulpo were opened. An insurrection of the more conservative Koreans, 1894, caused Japan to land a force for the protection of her interests. China, as the suzerain of Korea, sent troops to aid the government and requested the Japanese to withdraw. This they refused to do until certain "reforms" were guaranteed, and China finding herself unable to agree to this, hostilities were begun by Japan, and war with China was declared. Beaten at every point in Korea, Manchuria, and Shantung, the Chinese sued for peace, and by the treaty of Shimonoseki (1895) acknowledged Korea's independence. Japanese influence soon became paramount, many reforms being introduced with the aid of money borrowed from Japan, and, 1904, by treaty between Korea and Japan, the latter undertook to insure the safety of the imperial household and guaranteed the independence and territorial integrity of the empire, while Korea undertook to adopt the advice of Japan in regard to improvement in administration. By another treaty, 1905, Japan obtained the right to control and direct the external relations and affairs of Korea, to be represented at court by a resident general, and to station residents at the open ports and such other places as it might deem necessary. Under the Russo-Japanese treaty of September 5, 1905, Russia acknowledged Japan's paramount interests in Korea. On July 25, 1907, the emperor having abdicated in favor of his son, an agreement between Korea and Japan was signed by which the government of the former was practically placed in the hands of the latter.

Kos (kōs). See Cos.

Kosciusko (kŏs-sĭ-ŭs'kō), **Thaddeus**, in Polish TADEUSZ KOSCIUSZKO, 1746–1817; Polish patriot; b. Lithuania, of an ancient princely race; was made an officer in a regiment, but having sued in vain for the hand of a daughter of the vice grand general of Lithuania, and the King of Poland himself being unable to forward his suit with the unwilling father, he sailed, 1777, from Dantzic for the U. S. He served gallantly through the War of the Revolution, was made a member of the Cincinnati, a brigadier general by brevet, and received the thanks of Congress. Returning to his native land, 1786, he fought against the Russians in the war of 1792. In spite of the brilliant victory at Dubienka, and the generally successful conduct of the war, the king, Stanislaus, concluded a humiliating peace, and, 1793, the second partition of Poland followed. A general rising took place, and Kosciusko was made dictator. He defeated the Russian army before Cracow, and drove it beyond the Prussian frontier. Warsaw massacred and expelled the Russian garrison, and for a moment the liberty of Poland seemed assured. A Prussian army now entered the country from the one side, while two Russian armies, under Suwarow and Fersen, advanced from the other, and, notwithstanding the prodigies of valor performed by the unhappy Poles, with Kosciusko at their head, they were totally overpowered at Maciejowice, where their commander fell covered with wounds. Imprisoned at St. Petersburg, he was set free, 1796, by the Emperor Paul, from whom he refused the offer of a sword. He revisited the U. S., where he received a pension and a grant of land, but in the following year returned to France. The address to the Polish people which Napoleon issued in his name in order to make them rise against Russia, he openly disavowed. In 1816 he fixed his residence at Soleure, Switzerland, and in the following year set free the serfs on his paternal estate.

Kosciusko, Mt., highest peak of the Australian Alps; 7,176 ft. high; on the boundary between the states of New South Wales and Victoria, about equidistant between Sydney and Melbourne. The chain of mountains to which it belongs affords the most picturesque scenery on the Australian continent.

Ko'sher, in Jewish ordinances, a word applied to meat killed and prepared by Jews after the ancient manner; hence "pure," or fit to be eaten by Jews.

Kosovo (kō'sō-vō), plain in Turkey, near the Servian frontier, W. of the Prishtina, on which two battles were fought: (1) between Sultan Murad I and the Servians under their Czar Lazar, June 15, 1389; both sovereigns fell, and the Servians lost their independence in consequence of their defeat; (2) between the Hungarian general Hunyady and Sultan Murad II, October 17-19, 1448, when the former was defeated.

Kossuth (kŏsh'ŏt), **Francis**, 1849– ; Hungarian statesman; b. Pest; son of Louis Kossuth, went into exile with his father, after whose death he returned to Hungary; took the oath of allegiance as a Hungarian subject; entered political life; became a leader of the party aspiring to national independence; united his opposition following with that of Count Apponyi, 1904; aided greatly in carrying the elections, 1905, and in the Coalition Cabinet of Dr. Alexander Wekerle, 1906, became Minister of Commerce.

Kossuth, Louis, or Lajos, 1802–94; Hungarian patriot; b. Monok, Hungary, of a family originally Slavic, but of noble rank and of the Lutheran faith; became an advocate of Monok, 1822; removed, 1831, to Pest; was a member by proxy of the Upper House of the Diet of 1832–36; and by his ceaseless activity as a writer and journalist did much to disseminate liberal principles; was imprisoned at Buda, 1837–40, as a political offender; editor of the *Pest Journal*, 1841–44; entered the Lower House of the Diet, 1847, and became the leader of the Liberals. He headed the deputation of 1848 demanding a new ministry, in which he became Minister of Finance; proposed, 1849, the independence of Hungary; was during the Hungarian war for liberty provisional governor of Hungary, April–August, 1849, and was succeeded by Görgei; escaped to Turkey, where he was protected, notwithstanding the demands of Austria and Russia for his extradition. In 1851 he was allowed to go on board the U. S. steamer *Mississippi*, which had been sent out for him by the U. S. Govt.; visited England; made the tour of the U. S., 1851–52, and delivered many eloquent, though fruitless, appeals for the influence of the U. S. in behalf of the principle of nonintervention, believing that if Russia had not assisted Austria, 1849, Hungary would have become free; after 1852 resided in London, and after 1863 in Turin (where he died), engaged in political projects, public speaking, writing for liberal journals, and latterly in scientific observations. He denied all participation in the insurrection in Milan in February, 1853. During the wars of Austria against France (1859) and Prussia (1866) he was actively engaged in preparing for insurrections in Hungary, but the speedy termination of both wars frustrated his hopes. In 1879 he lost his rights as a Hungarian citizen.

Kos'ter, or Cos'ter, Samuel, abt. 1580–1650; Dutch poet; was a physician at Amsterdam, and belonged to the circle of eminent men who lived and wrote there—Hooft, Huyghens, Vondel, etc.; founded, 1617, the Duytsche Akademie, which replaced the older chambers of rhetoric; is chiefly known for his tragedies.

Kostro'ma, government of European Russia; situated nearly in the center of the country, and traversed by the Volga. The climate is severe, yet good crops of grain are produced. Tar, pitch, and potash are manufactured, and much timber is exported; area, 32,432 sq. m.; pop. (1905) 1,424,171. Also the capital city, on the Kostroma River near its junction with the Volga; has large manufactures of leather and linen, and an important trade in corn and timber; pop. (1907) abt. 41,236.

Ko'tah, independent Rajput state, under British protection, in Hindustan; pop. (1901) 544,879; capital, Kotah, on the Chambal; is fortified, and a town of some importance, having good bazaars, many temples, and substantial houses. Pop. abt. 40,000.

Köthen, or Cöthen (kö'tĕn), town in the Duchy of Anhalt, Germany; 19 m. N. of Halle; has a handsome ducal palace with several fine collections; good educational institutions, and important sugar industries; down to 1853 was the capital of the principality of Anhalt-Köthen. Pop. (1909) 23,026.

Kott'bus. See COTTABUS.

Kotzebue (kŏt'sĕ-bō), **August Friedrich Ferdinand von,** 1761–1819; German dramatist; b. Weimar; studied law; went, 1781, to St. Petersburg, where he was appointed to various important positions in the Russian civil service; returning to Germany, lived at Weimar and Vienna, devoting most of his time to writing of plays and farces; went back to Russia, 1806, and published violent attacks against Napoleon. He remained in Russian service, though he lived alternately in St. Petersburg and in Germany. In 1817 he was sent to Germany to report directly to the Russian emperor on the liberal movement there. The indignation among the German people was very great, and a student stabbed him at Mannheim. Kotzebue possessed great dramatic talent, wrote about 200 pieces, and was very popular for many years.

Kou'lan. See DZIGGETAI.

Koumiss (kō'mĭs), fermented beverage made from mare's milk in the steppes of Russia. The alcohol is derived from the milk sugar, which is present in mare's milk in larger quantity than in the milk of other animals. The fresh milk is diluted with one third to one sixth water, and placed in a sack of goatskin or the skin from the entire hind quarter of a horse, the wider end serving for the base, and the leg portion for the neck. There is generally added some yeast, the sediment from a previous brewing, called *kor*, to induce fermentation. Frequent stirring or shaking is essential to success. In from twelve to twenty-four hours the fermentation is complete, the product being known as young koumiss, or *saumal*. Fresh milk is added daily, and as the product is concentrated by the evaporation of water from the surface of the hide, the old koumiss is much stronger than the new. Besides alcohol and carbonic acid it contains the other constituents of the milk, except the sugar, and is consequently very nourishing. It is easily assimilated, even by invalids, and the hardy vigor of the Tartars is attributed to its general use among them.

Kouropat'kin. See KUROPATKIN.

Kov'no, government of W. Russia; bounded by Prussia and Poland, and watered by the Niemen and its tributaries; area, 15,518 sq. m.; pop. (1905) 1,553,244; rye, wheat, flax, and hemp are extensively cultivated; Kuvno is also the name of its capital city, at the confluence of the Vilia and the Niemen; 94 m. ENE. of Königsberg; has many good institutions for military, theological, and scientific education, and considerable trade; pop. (1903) 73,743.

Krajova (krä-yō'vä), town of Roumania; at one time the principal place in Little Wallachia; on the Schyl River; 160 m. W. of Bucharest; has twenty-seven Greek churches, a Protestant and a Roman Catholic church, several synagogues, a theater, several institutions of learning, a beautiful park, and productive salt mines in the vicinity. Pop. (1907) 45,579.

Krakato'a, a volcano on an island of the same name; in the Strait of Sunda, between Java and Sumatra. The earliest recorded eruption was in 1680. The volcano then became dormant, and stood as an irregular peak 2,623 ft. high until 1883, when there occurred one of the most stupendous eruptions ever known. The eruption began in May, and continued until August 27th, when a large part of the island was blown away, and fragments of pumice and dust thrown to a height by estimate of 20 m. Gaining the region of the upper air currents the dust was carried around the entire earth, and produced remarkable twilight glows for many months. The sound of the explosion was heard at a distance of 2,247 m. The waves produced in the air traveled four and a half times around the world. Sea waves 50 ft. high swept the neighboring shores, and smaller waves were observed on distant coasts over half the globe; 163 villages were destroyed, and 36,380 human beings perished.

Kra'ken, in Norse legend, a fabulous sea monster described first under this name by Pontoppidan, although Olaus Magnus, Gesner, and other old writers have substantially the same accounts. The tales of the kraken seem to have been exaggerated reports of large cephalopods and whales. Stories of its devouring ships, of its back being taken for an island and men landing on it, etc., recall similar fables in Lucian's and Pliny's works and the "Arabian Nights"; but Lucian's narrative is a witty satire on the credulity of other writers, who in all ages have seriously recorded these monstrous fables.

Kra'kow. See CRACOW.

Kran'ach. See CRANACH.

Krapot'kin. See KROPOTKIN.

Krasnovodsk (krăs-nō-vŏdsk'), Russian fortress and naval station; on a bay of the same name, on the SE. shore of the Caspian Sea; is an important starting point for scientific and military expeditions to central Asia.

Kraszewski (krä-shĕv'skē), **Jósef Ignacy,** 1812–87; Polish author; b. Warsaw; was editor, 1841–52, of *The Athenæum*, and 1859–62, of the *Polish Gazette*; went to Dresden as a political exile, 1863; fell a victim to Bismarck's hatred of the Poles; was tried for high treason, 1884, and sentenced to three and a half years' imprisonment, but was released, 1886, through the intervention of Humbert, King of Italy; thereafter lived in Italy and

Switzerland. He wrote "Anafielas," an epic based on Lithuanian history; also novels, romances, histories, critical essays, etc.; in all, over 400 volumes.

Kre'feld. See CREFELD.

Krem'lin, in Russia, a citadel or walled inclosure; especially in Moscow a district occupying a high triangular plateau surrounded by crenelated walls, and comprising an extraordinary aggregation of public buildings, palaces, and churches of fantastic form and varied color. The distant aspect of the group, with its curious spires and bulbous cupolas, is impressive and wholly unique.

Kreuzer (kroits'ĕr), small coin which originated in the Tyrol in the thirteenth century, so called from the cross formerly conspicuous upon it. The coin became common in various German countries, and until 1876 was current in S. Germany as equal to the sixtieth part of a gulden. Down to 1892, when the new coinage system was introduced into Austria, the kreuzer was current as the hundredth part of a gulden.

Krish'na. See VISHNU.

Krishna, or **Kist'na**, one of the largest rivers of Hindustan; rises in the Western Ghats, about 40 m. from the Malabar coast, flows SE. across the Peninsula of Deccan for 800 m., and enters the Bay of Bengal near Masulipatam.

Kristia'na. See CHRISTIANIA.

Kris'tiansand. See CHRISTIANSAND.

Kronberg (krōn'bĕrkh), **Johann Julius**, 1850– : Swedish historical and figure painter; received the great gold medal in Stockholm, 1870, and, 1873, was sent abroad to study at the expense of the Swedish Govt. Among his most celebrated works are "Cleopatra's Death" and "David and Saul."

Kronstadt. See CRONSTADT.

Kropot'kin, Peter Alexeivitch (Prince), 1842– : Russian geographer; b. Moscow; served for a time in the army; made several journeys in and across Manchuria; explored the glacial deposits in Finland and Sweden; published accounts of his travels in "Memoirs" of the Russian Geographical Society, articles on Russian geography in various encyclopedias, "Recent Science in Nineteenth Century," "Words of a Revolutionist," "Anarchy: its Philosophy and its Ideals," "The State: its part in History," "Fields, Factories, and Workshops," "Modern Science and Anarchism," "The Desiccation of Asia," etc.; became an active anarchist; was expelled from several European cities and imprisoned in others.

Krozet (krō-zā') **Is'lands.** See CROZET ISLANDS.

Krug (krōg), **Wilhelm Traugott**, 1770–1842; German philosopher; b. Radis, Saxony; was one of the most efficient promulgators of the Kantian philosophy, and proposed a system called "transcendental synthetism," to reconcile idealism and realism. In 1804 he succeeded Kant as Prof. of Logic and Metaphysics at Königsberg, and was Prof. of Philosophy at Leipzig, 1809–34. After 1813 he was a leading champion of German liberalism.

Krü'ger, Stephanus Johannes Paulus, 1825–1904; Boer statesman; b. near Colesberg, Cape Colony; took part as boy and youth in the long wanderings of the Boers to Natal, the Orange River territory, and the Transvaal; won great popularity and distinction, first as a military leader in campaigns against the natives, and against the British, 1880–81, and then as a shrewd and able diplomat in negotiations with Great Britain both before and after the war with that country; was elected President four times (1883, 1888, 1893, 1898); with little education, he had large knowledge of men, and great influence on his people, who called him "Oom Paul." After the war of 1899–1900, he went to France, then made his home in Utrecht, Netherlands; published "The Memoirs of Paul Krüger, Four Times President of the South African Republic."

Krung-kao (krōng-kä'ō), or **Ayuthia** (ä-yō'thē-ä), city of Siam; 40 m. N. of Bangkok, on the Menam; is the great entrepôt of the trade with the Laos. The most of the houses are floating, because considered more healthful. Under the older name of Ayuthia this place was the capital of Siam, and one of the finest cities in Indo China. It was sacked by the Burmans, 1767, and has never recovered its former position. Pop. abt. 50,000.

Krupp, Alfred, 1812–87; German inventor; b. Essen, Rhenish Prussia; son of Friedrich Krupp, proprietor of a small foundry at Essen, who discovered the art of making cast steel, which had been kept secret in England, but died almost in poverty in 1826, and was succeeded in the business by his widow and her two sons. In 1848 Alfred Krupp became sole proprietor, and before many years was enabled through his inventions to enlarge the works until they became the most extensive in the world. In 1861 a breech-loading rifle invented by him was introduced into the Prussian army. The adoption of steel as a material for gun construction brought orders from many governments, and incited Krupp to further efforts. In 1880 a steel gun of 100 tons weight was cast; 1889–90, one of 135 tons for the Russian Govt.; and, 1892, one of 124 tons, which was exhibited at the Columbian Exposition at Chicago. He was succeeded by his son Alfred, on whose death (1902) his daughter Bertha inherited his vast possessions.

Krusenstern (krō'zĕn-stĕrn), **Adam Johann von**, 1770–1846; Russian navigator; b. Esthonia; circumnavigated the globe, exploring chiefly the N. Pacific coasts of America and Asia, 1803–06. The results were given in his "Voyage Around the World," supplemented by "Contributions to the Hydrography of the Greater Oceans" and "Atlas of the Pacific Ocean."

Kryloff, or **Kriloff** (krē-lŏf'), **Ivan**, 1768–1844; Russian author; b. Moscow; wrote fables which are as common in Russian households as the "Pilgrim's Progress" is in England, and have been translated into several modern languages.

Kryp'ton, gaseous element, discovered, 1898, by Prof. William Ramsay and Dr. Morris W. Travers, of London, England. It is found in minute quantities, not over one part in 10,000 of the volume of the atmosphere, of which it makes a fifth constituent. It belongs to the helium group, and has a density greater than that of nitrogen (22.47). It was obtained by evaporating 750 cu. cm. of liquid air until not more than 10 cu. cm. was left. The gaseous residue thus obtained was freed from oxygen and nitrogen and then sparked in the presence of oxygen and caustic soda, when a spectrum was obtained showing the argon lines feebly; but in addition a new spectrum was observed, which was characterized by two very brilliant lines.

Kublai-Khan (kō'blī-kän), 1216–94; founder of the twentieth or Mongol dynasty of Chinese emperors; b. Tartary; was the grandson of Genghis Khan. Abt. 1250 he was invited by the Chinese to aid them in driving out the Oriental Tartars. Having effected this, he established himself in China, and, 1260, assumed the title of emperor. He reformed the army and the administration of civil affairs, and called to his court men of letters from all countries, among them Marco Polo. He failed in the attempted conquest of Japan, but subjected Tonking and Cochin China, and reigned as emperor from the Arctic Sea to the Straits of Malacca, and from the Yellow Sea to the Euxine.

Kuch Behar, or Cooch Behar (kōch bā-här'), feudatory state in Bengal, British India; entirely surrounded by British territory; area, 1,307 sq. m.; pop. (1901) 566,074. It is a uniform and fertile plain, formed from the alluvium which descends from the Himalayas, and thoroughly watered by affluents of the Brahmaputra. The principal products are rice, jute, and tobacco. The climate is wet and unhealthful; malarial fevers and cholera are common. The capital, and only place of importance, is the town of Kuch Behar, 250 m. NNE. of Calcutta, on the Torsha.

Kuenen (kū'nĕn), **Abraham,** 1828–91; Dutch theologian; b. Haarlem; became Prof. of Theology at Leyden, 1852; published "Historico-Critical Investigation into the Origin and Collection of the Old Testament Books," "The Religion of Israel to the Fall of the Jewish State," "The Prophets and Prophecy in Israel," besides essays and papers.

Kuenlun, or Kwun-lun (kwĕn-lōn'), mountain range of central Asia, which commences near the point from which the Himalayas, the Hindu-Kush, and the Bolor-Tagh radiate in different directions, and stretches E., forming the N. boundary of Tibet proper. The E. parts of this mountain range extend into China proper, under the names of Tsing-ling and Fū-nin-shan; the W. part, generally known by the names of Karakorum and Murtagh, rises to a height of 23,000 ft., and is covered with glaciers.

Ku'fa, former town of Asiatic Turkey, in Mesopotamia, on an affluent of the Euphrates; 88 m. S. of Bagdad; was founded by Omar, who made it his residence, and who was murdered here. It soon became the seat of Arabic learning, and the ancient Arab characters called Cufic received their name from this place.

Ku'fic Writ'ing. See CUFIC WRITING.

Kuhn (kōn), **Adalbert,** 1812–81; German philologist; b. Brandenburg; became, 1856, professor in the gymnasium of Cologne. His numerous writings made him celebrated in comparative philology and as the founder of the science of comparative Indo-Germanic mythology.

Ku-klux' Klan, former secret association, in the U. S., in several of the S. states, formed to prevent negroes, by intimidation, from voting or holding office. The society first came into general notice 1867, and many murders and other crimes were committed by its members, who dressed in fantastic disguises. The victims were chiefly freedmen, persons of Northern origin, and Southerners accused of favoring the reconstruction acts of Congress.

Kulja (kōl'jä), district in province of Sinkiang, Chinese Turkestan; area, 23,000 sq. m.; pop. est. 80,000; settled chiefly along the middle courses of the river Ili. In 1865 the Mohammedan population rebelled against the Chinese, and the population was reduced from 2,000,000 to 139,000; 1871–81, the province was under the care of Russia, which, when peace was restored, retained 4,375 sq. m. in the NW. as a refuge for the rebels. Old Kulja, on the banks of the Ili, is a walled town with extensive suburbs; pop. 12,000; New Kulja, 25 m. to the W. of this, founded by the Chinese, 1764, was the Chinese capital. At the time of the rebellion its population was 75,000. It is now a mere fort, surrounded by a heap of ruins.

Kulm (kōlm), village of Bohemia, 8 m. NE. of Teplitz; noted for the battle which took place here August 29–30, 1813, in which a French corps under Vandamme was surrounded by the allied armies of Russia, Prussia, and Austria, and compelled to surrender after a desperate resistance, with 80 pieces and 10,000 men, having lost 5,000 men.

Kulturkampf (kōl-tōr'kämpf), German name for the struggle between Protestantism and Romanism which was carried on in Prussia and later in the German Empire. The object on the part of the government was to control the educational and ecclesiastical appointments. At first the Protestant party succeeded under Falk. The Landtag passed the famous May laws, 1873–74–75 (see FALK LAWS), and, 1874, made marriage a civil rite. The Jesuits were expelled, 1872; several Roman Catholic sees and many parishes were vacant; many Roman Catholic schools were closed. The pope refused to receive the German ambassador and affairs were at a deadlock, but, 1878, on the election of Pope Leo XIII, there was an attempt at compromise. In the following year Falk resigned; 1881 and 1883 the laws were modified; and, 1887, important concessions were made to the Roman Catholic Church.

Kumas'si, capital of the Kingdom of Ashantee, in W. Africa; about 120 m. NNW. of Cape Coast Castle; lat. 6° 35′ N., lon. 2° 12′ W. It was captured by the British in 1874, and again in 1895. Pop. (1907) 7,000.

Kum. See KOM.

Kumamo'to, city of Japan; on the island of Kiushiu; was formerly the castle town of the family of Hosokawa, daimios of Higo; is now an important military and educational center. Pop. (1903) 59,717.

Kurdistan (kôr-dĭs-tăn′), extensive region of W. Asia, lying between lat. 34° and 38° N. and between lon. 42° and 47° E. It forms no independent political unit, but is divided between Turkey and Persia, though its relations to both of these two powers are somewhat loose. Its area is estimated at 100,000 sq. m., the number of its inhabitants at 2,000,000, of whom four fifths are Kurds. The country is mountainous, some of the peaks rising to the height of 13,000 ft., intersected by beautiful valleys along the rivers, which in great number flow down to the Euphrates and Tigris. The Kurds, who are Mohammedans, live mostly as nomads. They are a proud and fierce race, engaged in the rearing of cattle, sheep, goats, and horses.

Kuria Muria (kō′rē-ä mō′rē-ä). See KHORYA MORYA.

Kurils (kō′rĭls), chain of islands stretching in a NE. direction, between Yezo and Kamchatka, mostly uninhabitable. Most of the islands became Russian property during the eighteenth century, and received their Russian name (Kurile, literally, "the smoker") because of the numerous active volcanoes; the Japanese name is Chishima, or Thousand Islands. In 1875 the Japanese Govt., which had always claimed certain of the S. islands, secured the whole by treaty, in exchange for the S. extremity of Saghalin.

Kur'land. See COURLAND.

Kuro'ki, Itel (Baron), 1844– ; Japanese military officer; b. province of Satsuma; a member of the formidable Kagoshima clan. On the outbreak of the war with China, 1894, he was selected by Field Marshal Oyama to command the right column of the army selected for the movement against Wei-hai-Wai, and captured that strong post, for which service he was created a baron. When the war with Russia began, 1904, Kuroki was appointed leader of the first army, of 45,000 men, with rank of lieutenant general, for operations in Korea and Manchuria. He displayed great ability in moving his forces quickly and in overwhelming the Russian artillery by the accuracy of his gunfire at the passage of the Yalu. Having received reënforcements, and made connection with the forces under Gens. Oku and Nodzu, he captured, June 27th, the Ta-ling and Mo-tien-ling passes, carried Yan-su-ling, Yu-shu-lin-tzu, and other fortified positions, and after about seven days of continuous struggle, forced the evacuation of Liau-yang, September 4th. In the battles around and at Mukden, and later at Tie Pass, he displayed a brilliant generalship that made him more than ever the idol of the Japanese. Baron Kuroki visited the U. S., 1907, and was most cordially received by the President, army officers, Japanese residents, and citizens generally.

Kuropat'kin, Alexei Nicolaievitch, 1848– ; Russian military officer; b. government of Pskov; graduated at the Nicolai Academy of the General Staff, 1874; became chief of staff to Gen. Skobeleff in Turkestan, 1877; took part in the Khokand and Kashgar campaign and in the Russo-Turkish War; promoted to general, 1882; appointed commander of the province of Transcaspia, 1890; of the Trans-Caucasus district, 1897; and Minister of War, 1898. On the outbreak of war with Japan (February, 1904) he was appointed commander of the forces in Manchuria, and was steadily driven from the Yalu River to Haicheng, Liao-yang, and Mukden, making a stubborn resistance all along the route, and being unable to relieve Port Arthur. After the battle of Mukden he resigned his command, was succeeded by Gen. Linievitch, and remained with the army as a subordinate. In 1907 he published "History of the Russo-Japanese War," which was suppressed by the Russian Govt., in which he blamed the bureaucracy for the Russian disasters, and charged cowardice, incompetency, and disobedience against high officers.

Kuroshiwo (kō-rō-shē′wō), branch of the Pacific N. equatorial current which impinges on the E. shores of Formosa and adjacent islands. While the larger part of the equatorial current passes into the China Sea, a portion of it is deflected to the N., along the E. coast of Formosa, and accelerated by the SW. monsoon, until reaching the parallel of 26° N. it bears off to the N. and E., washing the whole SE. coast of Japan, and increasing in strength as it advances. Thence between the parallels of 30° and 42° N. it takes a more E. course, crossing the N. Pacific on a line not extending N. of 50° N. lat., and gradually losing its velocity and becoming merged in the warm E. drift of the N. Pacific, though by its temperature the Kuroshiwo has been traced as far E. as the meridian of 155° W. Greenwich. The Kuroshiwo sends a branch N. into the Yellow Sea, and another through the Straits of Korea into the Japan Sea. It has long been supposed that a third branch passed N. into Bering Sea near the Kamchatkan coast, but this idea is absolutely inaccurate.

Kursk, capital of the government of Kursk, European Russia; on the Seim; is a flourishing town, with an extensive trade in tallow, rope, and fruit, and many good educational institutions. In the neighborhood of Kursk one of the greatest fairs of the country is held annually after Easter.

Kus'kokwim, river of Alaska; second in size in the territory; running S. of the Yukon, and probably parallel to it, but its course is very imperfectly known; empties into the Bay of Kuskokwim, Bering Sea.

Küstenland (küs′tĕn-länt). See ISTRIA.

Kutais (kō-tīs′), government of Asiatic Russia, in Caucasia; bordered W. by the Black Sea, S. by Asiatic Turkey, and E. by the government of Tiflis; area, 14,100 sq. m.; pop. abt. 1,000,000. The capital, Kutais, is on the Rion (the ancient Thasis), and stands on the site of the ancient Cutatisium or Cytæa, the capital of Colchis. Pop. (1907) abt. 32,476.

Kutusoff (kō-tō′zōf), **Mikhail,** or **Michael,** 1745–1813; Russian military officer; became major general, 1784; was the leader in the capture of Ismail; became lieutenant general, 1791; entered Germany at the head of 50,000 men and defeated Mortier at Dürrenstein; appointed general in chief, 1812; lost the battle of Borodino, but for his energy received the baton of a field marshal. He inflicted great losses on the French in the battles of Malo, Jaroslavatz, Krasnoë, and Smolensk, for the latter of which he was created Prince of Smolensk.

Kwangtung′, extreme S. province of China, containing with its islands 99,970 sq. m.; pop. (1906) 31,865,250; bounded W. by Kwangsi, N. by Hunan, Kiangsi, and Fukien, and S. and E. by the sea; traversed by the parallel ranges of the mountain system called the Nan-Shan, or Southern Mountains; chief rivers are the Si-kiang, or West, the North, the East, and the Han. The coast line is much broken, and islands are numerous. The largest is Hainan. The most important (though now a British possession) is Hongkong. The capital is Kwangchan or Canton.

Ky′anite, or **Cy′anite,** a beautiful mineral (sometimes called DISTHENE), a form of silicate of alumina. It often occurs crystallized, and generally in broad prisms. It is transparent or translucent, sometimes opalescent, and exhibits various shades of blue. Its formula is $Al_2O_3SiO_2$.

Kymry (kĭm′rĭ), name given by the Welsh to their nation. It is frequently extended to the entire branch of the Celtic race to which the Welsh belong. To this branch also belong the people of Bretagne in France and the ancient races of Cornwall, Cumberland, and Strathclyde. There is reason to believe that a great part of the ancient British race was Kymric, and many Kymric roots appear to have been found in Gaulish and Belgic names.

Kyoto (kē-ō′tō), third city of Japan in population, and for over 1,000 years the residence of the emperors; about 25 m. inland from Osaka, and close to the S. end of Lake Biwa. The main portion of the city occupies a perfectly flat site on the S. bank of the Kamogawa, and is laid out with mathematical regularity; the N. portion, consisting largely of temples, lies on the slope of a range of hills. The historic palace of the mikados is at the W. end, simple structures of wood in an inclosure of about 26 acres. At the E. end are the great temples of the Hongwanji sect, with a college in the modern style. Here is the center of Japanese Buddhism. On the summit of the range of hills separating the city from Lake Biwa, and at an altitude of over 2,000 ft., are the magnificent temples of Hiyeisan, founded abt. 800 A.D., and the parent institution of numerous abbeys established elsewhere over the kingdom. Kyoto is the center for the production of fine art wares, silk crapes, velvet, brocades and embroideries, cloisonné, enamel, pottery, bronze. Pop. (1903) 380,568.

Kyrie (kīr′ĭ-ē), first word in the Greek of "Kyrie eleison" ("Lord, have mercy"), a petition often occurring in the liturgies, masses, and other offices of the Roman Catholic and Greek churches, and used to designate the opening movement of musical masses, requiems, and various services which begin with the words "Kyrie eleison," "Christe eleison." For this reason the term is applied in the Anglican Church to the responses between the commandments in the Communion office, "Lord have mercy upon us." This Lesser or Minor Litany, as St. Benedict terms it, is found both in the day offices of the Church and in the service for the celebration of the holy communion, and in some of the occasional services. It was first introduced into the West from the East by St. Sylvester, 321 A.D. In the Ambrosian rite it is thrice sung after the "Gloria in Excelsis."

L

L, the twelfth letter of the Phœnician and other Semitic graphic systems and of most modern European alphabets. The sound is produced by placing the tip of the tongue against the upper incisor teeth, while the breath issues at its sides and the larynx vibrates; hence called a linguidental. It has but one sound. See ABBREVIATIONS.

Laaland, or **Lolland** (lä′länd), island of Denmark, in the Baltic; separated from Falster by the stretch of water called Guldborgsund; area, 444 sq. m.; pop. (1901) 70,596; is low and flat, but fertile and well cultivated; principal towns, Maribo and Naskov.

La Antig′ua. See DARIEN; GUATEMALA LA ANTIGUA.

Labadie (lä-bä-dē′), **Jean de,** 1610–74; French mystic; b. near Bordeaux; became a distinguished Jesuit professor, but in 1639 he left the Jesuits. In 1650 he became a Protestant pastor at Montauban, in 1657 at Orange, in 1659 at Geneva, and in 1666 pastor of a Walloon church at Middelburg, Holland. In 1669 he removed to Amsterdam and formed a body of followers known as Labadists. Expelled from Holland, 1670, went to Erfurt, where the Princess Palatine Elizabeth protected him; afterwards went to Bremen, and

finally to Altona, Holstein, where he died. His doctrines were a combination of mysticism with Calvinism; he held to illumination by the Holy Ghost as the means of salvation, superseding the Bible; rejected infant baptism and observance of the Sabbath, and taught property communism.

Lab'arum, military standard of Constantine the Great, adopted in commemoration of the appearance of the cross in the sky when he was on the march against Maxentius. It consisted of a pole or pike with a horizontal bar, forming a cross, from which depended a square purple banderole, ornamented with fringes and precious stones. The staff was surmounted by a golden crown set with jewels, in the midst of which was the monogram of Christ, with the occasional addition in later times of the Greek letters alpha and omega.

LABARUM.

Lab'danum, or **Lad'anum**, the resin of small evergreen shrubs of the order *Cistineæ*, *Cistus creticus*, *laurifolius*, and *ladaniferous*, growing chiefly in the Levant. It is combed from the beards of goats and the fleece of sheep that browse upon the hills where these shrubs grow. It is used as an incense and for fumigating; also sometimes in plasters.

Labiche (lä-bēsh'), **Eugène Marie**, 1815–88; French playwright; b. Paris; produced, generally in conjunction with another, over 100 comedies, farces, vaudevilles, etc., including "La cuvette d'eau," "Le Voyage de M. Perrichon," "Doit-on le dire?" "Les Petits Oiseaux."

Labienus (lä-bī-ē'nŭs), **Titus**, d. 45 B.C.; Roman soldier; tribune in 63 B.C., when Cicero was consul; accompanied Cæsar as his lieutenant to Gaul, and distinguished himself in 54 B.C. by his two victories over the Treviri, and in 52 in the campaign against Vercingetorix. He sided with Pompey when the civil war broke out. After the defeat of Pharsalia he fled to Africa, and thence to Spain after the defeat at Thapsus. In Spain he fought against Cæsar at Munda, and by his mistakes the battle was lost.

La'bor Day, in the U. S., a legal holiday, first celebrated (by a few states), 1887. It falls, with a few exceptions, on the first Monday in September. In Europe generally May 1st is celebrated as a labor festival, and in London, Paris, and other cities demonstrations in favor of reforms are made by trades unions and similar organizations. In some countries disturbances caused by socialists on this day have led the governments to forbid celebration.

Labor, Depart'ment of. See COMMERCE AND LABOR.

Labori (lä-bō-rē'), **Fernand**, 1860– ; French lawyer; b. Rheims; called to the bar, 1884; best known for his part in the Dreyfus appeal, the Zola and Humbert cases, and a number of cases involving rights in theatrical productions; editor "Repertoire Encyclopædique du Droit Français," twelve vols.

Labor Organiza'tions. See TRADES UNIONS.

Labouchere (lä-bō-shär'), **Henry**, 1831– ; English editor and politician; b. London; in diplomatic service, 1854–64; entered Parliament, 1865, as a Liberal; is an extreme Radical. During the siege of Paris he wrote a series of letters to *The Daily News* which attracted much attention, and were published in a volume, "Diary of a Besieged Resident in Paris." He is proprietor and editor of the London *Truth* and part owner of *The Daily News*.

Laboulaye (lä-bō-lā'), **Édouard René Lefebvre**, 1811–83; French publicist; b. Paris; Prof. of Comparative Legislation at the Collège de France, 1849; member of the National Assembly, 1871; secretary of the Committee of Thirty on the (Republican) Constitution, 1874; life Senator, 1875; administrator of the Collège de France, 1873, 1876–79. His works include "History of Landed Property in Europe," "Political History of the United States from the First Attempts at Colonization to the Adoption of the Federal Constitution," "The United States and France," "Paris in America," and an edition of the "Memoirs and Correspondence of Franklin."

Labrador', peninsular area which lies between the Gulf of St. Lawrence, Hudson Bay and Straits, and the N. Atlantic; greatest length, 1,100 m.; greatest breadth, 600 m.; area, about 420,000 sq. m.; bounded E. by the Atlantic, N. and W. by Hudson Bay and Straits, and SW. by the Bersiamits, Mistassini, and Rupert rivers. The Atlantic coast is under the jurisdiction of Newfoundland; the remainder is annexed to the Dominion of Canada and forms the district of Ungava. The Atlantic coast presents throughout its whole extent a lofty, precipitous front to the ocean, with an elevated plateau behind formed of rugged hills and low mountain chains. The highest land lies along the seacoast, its elevation increasing as it extends N. The Mealy Mountains rise to 1,482 ft. Mt. Misery, between Cape Harrison and Hopedale, is 2,170 ft. Some 70 m. S. of Cape Chudleigh the highest summit is 6,000 ft; but the elevation then diminishes to the cape, where it is 1,500 ft. The interior is a rolling plateau, broken by rocky ridges, and about 800 ft. above sea level. There are large deposits of iron ore; copper has been found in several places, and gold in small quantities. Labradorite, a beautiful feldspar, is found in great masses, several mountain ranges being largely composed of it. The lakes of Labrador are innumerable, the rivers forming but an imperfect system of drainage.

Over a fourth of the entire fish export of Newfoundland is caught on the Labrador coast, while the fishermen from Canada and the U. S. carry away about one ninth of the entire quantity. In favorable years the aggregate value of fish taken by Canadian and U. S. vessels and by Eskimos is $4,000,000. The climate is rigorous. The snow lies from September till June. In winter the whole coast is

blockaded by ice fields drifting from the Arctic Ocean. In winter 30° below zero is common, but, owing to the dryness of the air and the absence of high winds, such a temperature is not so uncomfortable as is a much higher one in other regions. The summer climate of the interior is said to be delightful.

The permanent inhabitants are the Eskimos, the Indians of the interior, and the white residents on the shores. The Eskimos have their proper home on N. Labrador, from Cape Webeck to Cape Chudleigh, are scattered along 500 m. of coast, and number abt. 1,500. The Moravian missionaries have been among them for more than a century, and nearly all are under Christian training. The Indian tribes of the interior are the Montagnais and Nasquapees, who speak the Cree dialects. The latter are still heathens, but the Montagnais are all nominally Roman Catholics, having been converted by Jesuit missionaries. The white inhabitants of the Atlantic coast are in widely scattered settlements S. of Cape Harrison. The chief European settlements on the E. coast are Battle Harbor and Rigolet. Est. pop. of Labrador (1907) 4,024.

According to the N. sagas, Biorn and Eric the Red discovered Labrador about the year 1000, and named it Helluland. Its modern discoverer was John Cabot, 1497, the year in which he discovered Newfoundland. A few years after the Basques, who were among the most daring of early mariners, were employed in fishing on the gulf coast of Labrador. After the Basques came the Bretons, and then the French and the British. Cortereal in 1500 carried home some of the aborigines (probably red Indians), who seemed so well adapted for labor that King Emanuel thought he had obtained a new slave coast whence slave laborers might be exported to the Portuguese colonies. Hence, it is said, he named it Labrador, or "laborers' land."

Lab'radorite, soda-lime feldspar, of grayish hue, with brilliant reflections of color on cleavage, or, when polished, chiefly blue, green, or bronze. It occurs largely in Labrador, also in the Adirondack Mountains; and, though not much used, makes an elegant ornamental stone. In Russia columns and walls of churches are paneled with it.

La Bruyère (lä brü-yär'), **Jean de,** 1645–96; French author; b. Paris; admitted to the bar, 1665; purchased a treasury office in the district of Caen, 1673, but continued to live in Paris; after 1684 was attached to the House of Condé, with a pension. He published anonymously, 1688, "Caractères, ou les Mœurs de ce Siècle," founded on the "Characters of Theophrastus," which he translated into French and prefixed to his own. The work, consisting essentially of satiric pictures of human morals, ranks among the masterpieces of French literature by reason of its brilliant and epigrammatic style.

Labuan (lä-bô-än'), island and, since 1890, British Crown colony, in the Malay Archipelago; 6 m. NNW. of Borneo; area, 31 sq. m.; pop. (1907) 8,286; ceded to Great Britain, 1849; chiefly important from its central position with regard to Borneo, Annam, the French colony of Cambodia, and the Philippines. There are two ports, a good supply of water, and abundant mines of coal. Chief city, Victoria; pop. abt. 1,500. Sago, camphor, birds' nests, pearls, and coal are the chief exports.

Lab'yrinth, structure of intricate passageways which it is impossible to traverse without a clew. Of ancient labyrinths, the best authenticated is that at Arsinoë, near Lake Mœris, Egypt, which consisted of 3,000 chambers, half of them, below ground, being sacred burial places. Of the labyrinth said to have been constructed by Dædalus near Cnossus in Crete, for the confinement of the Minotaur, of that of Lemnos, and others, no traces exist.

Labyrin'thodon, gigantic fossil reptile, so named by Owen from the complex labyrinthic structure of the teeth; the same animal had been previously called *cheirotherium* by Kaup, from the resemblance of its tracks to impres-

LABYRINTHODON.

sions of the human hand. This animal, which possesses both saurian and batrachian characters, probably most nearly resembled a gigantic frog about 10 or 12 ft. long. It first appeared in the Carboniferous period, attained its greatest development in the Triassic, and then disappeared.

Lac, the sum of 100,000 rupees, worth about $37,500; term used in E. Indian commerce; 100 lacs make one *crore* of rupees.

Lac, resinous exudation from the twigs and branches of various trees in the E. Indies, caused by the punctures of the insect *Coccus ficus*, which swarms on trees yielding a milky juice. The exuding juice forms an incrustation around the twigs, and in this the insects make the cells for their eggs. It is of a deep reddish brown, of shining fracture, astringent, and bitterish. It colors the saliva red, and produces a dye of this color but little inferior to cochineal. The coloring matter is readily extracted by warm water; the lac itself is for the most part soluble in alcohol, also in an aqueous solution of borax, by which it may be distinguished from most common resins with which it is adulterated. The crude article broken off with the twigs is known as stick lac. This, broken up and its coloring matter partially removed by water, is called seed lac,

and when melted into masses lump lac. The more familiar variety known as shell lac (shellac) is prepared by melting the seed lac and straining it through fine linen bags, on a flat, smooth surface of wood, to harden. It dries in thin sheets, which break up into small fragments. Lac is principally used in making varnishes, sealing wax, cement for broken porcelain, etc., and (with caoutchouc) marine glue.

Laccadive (lăk'ä-dĭv) **Is'lands**, a numerous group of small islands in the Indian Ocean, consisting of twenty clusters, 100 m. from the Malabar coast; area, 744 sq. m. They belong to the Madras Presidency, British India. They are of coral formation, and many of them are mere barren rocks. The natives are called Moplays, are Mohammedans of Arabian descent, and live in stone huts. The only commerce is in cocoa fiber and betel nuts. Pop. (1901) 10,274.

Lac'colite, thick, lens-shaped body of intrusive igneous rock. When molten rock rises through the earth's crust, it may reach the surface and flow out, or it may stop at some lower level, open for itself a chamber by lifting the overlying rocks, and there congeal, forming a laccolite. The rock of laccolites, having cooled slowly and under great pressure, is composed, like granite, of crystals visible to the eye, and is compact. It resists erosion, so that in a region undergoing rapid degradation laccolites are apt to constitute mountains. Of this character are the Henry, La Sal, Navajo, Abajo, Spanish, and Elk Mountains of the U. S.

Lace, ornamental openwork of thread, twisted, plaited, or woven into patterns. Itself comparatively modern, lace is derived from two most ancient kinds of work, netting and embroidery, the former used by the Egyptians to ornament the borders of festival garments. The Greeks and Romans bordered their robes with embroidery, called, when of superior quality, *opus Phrygianum*, from the skill with which it was executed by Phrygian workers. At a very early period the laces of Venice, Milan, and Genoa were the best known. The "Venice point" lace, wonderful for delicate texture and elaborate design, became specially famous. The old Flemish laces, the Brussels point and the Mechlin, rivaled the best of the Italian. Every country of N. Europe, France (excepting Alençon), Germany, and England, learned the art of lace making from Flanders. In 1666 the manufacture of lace was established at Alençon by Colbert, with the aid of thirty Venetian women. A great demand was created for this lace, which became known as the point de France, and afterwards as the point d'Alençon. In 1640 lace making was a leading industry in Buckinghamshire, England, and in the seventeenth and eighteenth centuries it extended over a larger area than at present.

Lace consists of two parts, the ground and the flower pattern, or "gimp." In some cases, however, the design is not worked on a ground, but the different parts are connected with threads. The flower or other ornamental pattern may be made together with the ground, as in Valenciennes or Mechlin, or separately, and then worked in or sewn on (appliqué). Lace made by hand is divided into point and pillow. The former, termed needle point, *point à l'aiguille*, etc., is made with the needle on a parchment pattern. Point is also applied to lace produced by a particular stitch. Pillow lace is so termed from the pillow or cushion used in making it. On this pillow is fixed a stiff piece of parchment, on which the pattern is marked by means of small holes pricked in it, through which pins are stuck into the cushion. The threads for the lace are wound on bobbins—formerly bones, whence the term bone lace. By the twisting and crossing of these threads around the pins, the ground of the lace is made; while the pattern or figure is formed by interweaving a thread thicker than that forming the groundwork, according to the design indicated on the parchment. Guipure is a lace without ground, the designs being joined by "brides," or large coarse stitches.

The most noted laces are now those of Belgium, France, and England. One of the most important centers is Brussels. It is the fineness of the thread, as well as the delicacy of the workmanship, which has given to the best Brussels lace such celebrity and rendered it so costly. Mechlin lace formerly had a wide celebrity, and has been called the prettiest of laces. It is fine and transparent. Its distinguishing feature is the flat thread which forms the flower, and gives to this lace the character of embroidery; hence sometimes called *broderie de Malines*. The most important branch of the pillow-lace trade in Belgium is the making of Valenciennes, which is now chiefly made at Ypres, Bruges, Courtrai, Menin, Ghent, and Alost. The productions of Ypres are of the finest quality and most elaborate. Valenciennes lace is remarkable for the beauty of its ground, richness of design, and evenness of tissue. Grammont, Enghien, and Binche are also important centers. White and black point and pillow lace is made in every province of the kingdom.

It is estimated that there are over 500,000 lace makers in Europe, of whom nearly one half are in France. Of the French laces, the most noted is the point d'Alençon, of wide celebrity for more than two centuries. Bayeux and Caen are important centers of the lace industry, and are noted for black laces. The productions of Lille and Arras are well known. The Lille lace is noted for the beauty of its ground. The lace of Bailleul is strong and cheap, and is extensively used for trimming. The lace manufacture of Auvergne, of which Le Puy is the center, is considered the most ancient and extensive in France. Nearly every kind of lace is produced here. In England the making of lace is carried on chiefly in Buckingham, Devon, and Bedford. The best known of the English laces is that first made at Honiton in Devonshire. The Honiton guipure is said to surpass in richness and perfection any lace of the same kind made in Belgium. British point is an imitation lace made near London. Nearly every kind of lace is now made by machinery, and such excellence is at-

tained that it is often difficult even for a practiced eye to distinguish between the two kinds.

Lacedæmon (lās-ē-dē'mŏn). See LACONIA.

Lacépède (lä-sā-pād'), **Bernard Germain Étienne de la Ville** (Count), 1756–1825; French naturalist; b. Agen; favorite pupil and assistant of Buffon; curator in the Cabinet du Roi, 1785; Prof. of Zoölogy in the Museum of Natural History, 1795; member of the Institute, 1796. In political life rose to be president of the senate and Minister of State, and a peer; published works on electricity and physics; continued Buffon's "Natural History"; brought out as sequel to it "Natural History of Oviparous Quadrupeds and Serpents"; later published "Natural History of Fishes" and "Natural History of Cetacea."

Lachaise d'Aix (lä-shāz' dāks), **François**, 1624–1709; French ecclesiastic; confessor of Henry IV and of Louis XIII; b. Château d'Aix. He rapidly rose to be provincial of the Jesuit order. In 1675 he became confessor of Louis XIV. He was concerned in the Revocation of the Edict of Nantes, and in the persecution of Protestantism, and of Fénelon and other liberal prelates of the Gallican Church. Louis XIV built for him a splendid mansion in one of the suburbs of Paris. In 1804 the grounds were chosen for the largest cemetery of Paris, which is known as the Cimetière du Père Lachaise.

Lachesis (lăk'ē-sĭs), in Greek mythology, one of the three Mœræ, or Fates. See FATES, THE.

Lachine (lä-shēn'), Fr. for CHINA, so named by early explorers who hoped to reach China by passing up the St. Lawrence; village in Jacques Cartier Co., Quebec, Canada; 9 m. from Montreal, with whose harbor it is connected by a ship canal; opposite the village are the famous Lachine Rapids of the St. Lawrence River. Pop. 7,500.

Lachish (lā'kĭsh), city in S. Palestine, among the mountains separating the territory of Judah from the *Shephelah*, or plain of the Philistines. It was an almost impregnable hill fortress, but was taken and partially destroyed by Joshua (Josh. x, 31–35), and fortified by Rehoboam (II Chr. x, 32–35). It long resisted the assaults of the Assyrians under Sennacherib. Lachish was afterwards taken by Nebuchadnezzar at the downfall of Judah. Its ruins have been identified with the modern village Um-Lakis, on a round knoll covered with heaps of stones, on the left of the road between Gaza and Hebron, and with the adjoining Tel el-Hasy.

Lachlan (lăk'lăn), river of E. Australia; rises in New South Wales, joins the Murrumbidgee in 34° 30′ S. lat. and 144° 10′ E. lon., and after a course of 400 m. enters the Murray.

Lachrymal (lăk'rĭ-māl) **Gland**, or **Tear Gland**, the organ in man and other animals which produces tears. In man it is of the shape and size of an almond, and is found above the outer angle of the eye. Its secretion is discharged by some seven ducts into the space between the eyeball and the lid. At the inner angle of the eye are two apertures through which the supply of lachrymal secretion is taken up by the lachrymal canals, passed into the lachrymal sac, and thence through the nasal duct into the nose.

Lach'rymatory, popular name for the supposed tear bottles of the ancients, small glass or earthern vessels found in ancient Greek and Roman tombs. That they ever contained the tears of mourning friends is unlikely.

Lackawan'na, river in Pennsylvania; rises in Susquehanna Co., flows SW. through Luzerne Co., and enters the Susquehanna at Pittston. Its lower course for 30 m. passes through the largest anthracite coal basin in America, to which it gives name, though it is sometimes called the Wyoming basin.

Lack'land, John. See JOHN, KING OF ENGLAND.

Laclède (lä-klād'), **Pierre Ligueste**, 1724–78; French pioneer; b. Bion; became, 1762, a resident of New Orleans, where he established the Louisiana Fur Company under a charter from the director general of the colony, giving it the exclusive right of trading with the Indians on the Missouri. The pioneers under his direction made the first settlement on the site of St. Louis, February 15, 1764, erecting a house and four stores, and named the place in honor of Louis XV, King of France.

La Condamine (lä kōñ-dä-mēn'), **Charles Marie de**, 1701–74; French geographer; b. Paris; displayed great valor at the siege of Rosas, 1719; visited the East and Africa, and, 1735, Peru, measuring with Bouguer and others an arc of the meridian, and published a narrative of his travels. He wrote on geography and other sciences, discovered that the deflection of a plumb line by a mountain is large enough for measurement, and is said to have introduced caoutchouc into Europe.

Laco'nia, or **Lacedæ'mon**, extreme S. division of the ancient Peloponnesus; bounded W. by Messenia, N. by Arcadia and Argolis, E. and S. by the Argolian Gulf, the Myrtoan Sea, the Laconian and Messenian gulfs. To the S. it ended in the promontories of Tænarum and Malea, the present capes Matapan and Malio. To the Laconian Gulf flowed the Eurotas, on whose banks was the capital of Laconia, Sparta.

Lacordaire (lä-kōr-dār'), **Jean Baptiste Henri**, 1802–61; French preacher and orator; b. Recey-sur-Ource, Côte-d'Or; settled in Paris as an advocate, 1821; ordained priest, 1827; preacher at the Collège de Henri IV, 1830; and founded the journal *L'Avenir* in connection with Lamennais and Montalembert. He was a leader in the reaction against the skepticism of Voltaire. In 1832 the radical tone of his writings was denounced by the pope, and he retracted. In 1835 he began his celebrated *conférences* in Notre Dame; in 1842 entered the Dominican order. After 1853, being ordered to leave Paris on account of an ultramontane radical sermon, he lived in retirement

LACES.

1. Round Point
2. Valenciennes
3. Venetian Point
4. Duchess
5. Irish
6. Raised Venetian Point

at Sorèze. Author of "Conférences de Notre Dame," "Vie de Saint Dominique," "Lettres à un Jeune Homme," etc.

Lacquer (lăk'ĕr), properly a varnish made of lac, but by extension and much more commonly an Oriental varnish, the sap of a tree, into the composition of which lac may not enter at all. That used by the Chinese and Japanese is chiefly obtained by making incisions in the bark of the small tree *Rhus vernicifera*, of the same genus as the American poison ivy and poison sumach. These varnishes, when mixed with other ingredients and applied in successive coats to seasoned woodware, impart a highly polished lustrous surface. So-called lacquer ware is made in India by painting patterns on tinfoil or other leaf metal laid on wood, and then varnishing the whole; this is called Kashmir or Haidarabad lacquer, and in this the transparent finishing coat may or may not be made from real lac. A similar effect is produced by some Persian painted wares, the ground of which is generally papier-maché.

In India boxes and toys are made by covering a wooden core with a solid coat of what may be called sealing wax; this is sometimes put on in a viscous condition, in long ropes wound around the wooden body, and the whole surface is rubbed down and varnished many times. The colors are in the solid substance of the lacquer, the resulting effect being a marbling or sprinkle rather than a pattern. In these Indian wares real lac is much used. The Chinese and Japanese lacquer wares are more important, and in them there is no lac at all. Many varieties of lacquer are enriched by inlays of ivory or bronze carved in relief, as in the faces and hands of lacquered figures, or in whole figures, with mother-of-pearl, carved black horn, coral, and even small bits of fine stones; moreover, gold leaf and silver leaf are often laid down in pieces larger than the little squares named above, and cut to shapes to suit the patterns, and little flat objects of pottery or porcelain are also let into the black ground, especially in the splendid wares said to be by Korin, an artist of the seventeenth century, and his followers. Carved black and red lacquer like that of China is also made in Japan.

Lacretelle (lä-krē-tĕl'), **Jean Charles Dominique de**, 1766–1855; French historian; b. Metz; removed to Paris, 1787; editor of the *Journal des Debats*; secretary to the Duc de Rochefoucauld-Liancourt, 1790; associated in editing the *Journal de Paris*. He was accused of being a royalist, and imprisoned, 1797–99; Prof. of History in Paris, 1809–45; imperial censor, 1810; admitted to the Academy, 1811; ennobled by Louis XVIII, 1822. He wrote eight valuable histories covering the period from the outbreak of the revolution to 1846, and several other periods.

Lacroix (lä-krwä'), **Paul**, 1806–84; French scholar; b. Paris; wrote, under the pseudonym of "Le Bibliophile Jacob," many romances and works of curious learning about the books, the history, manners, and customs of the Middle Ages. He became distinguished by his efforts to improve the Bibliothèque du Roi; was appointed in 1855 conservator of the Arsenal Library, and edited from 1854 the *Revue Universelle des Arts*.

La Crosse, capital of La Crosse Co., Wis.; at the confluence of the La Crosse and Black Rivers with the Mississippi; 196 m. W. of Milwaukee. For many years its principal industry was lumber, but it is now engaged in general manufactures, and has a large wholesale trade with adjoining states. The manufactures include sawed lumber, sash, doors, and blinds, boots and shoes, machinery, tanned leather, carriages, flour, woolen and knit goods, beer and ale, and cigars. The city contains a U. S. marine hospital, asylum for the chronic insane, St. Francis Hospital, Washburn Public Library, and county courthouse and jail, and ships large quantities of lumber and grain. Pop. (1905) 29,178.

Lacrosse (lä-krōs'), game the origin of which is unknown further than that it is the development of a game called bagataway, which the early French settlers of Canada found among the Indians. The game had no rules, and consisted in an attempt of a varying number of players to throw or carry a ball with the aid of rackets, not unlike small hand nets, through an opposing mass of players. The French gave the game its present name, and it was not until abt. 1840 that it was first played by white people. Abt. 1860 the game became popular in Canada, and, 1867, Dr. W. George Beers, of the Montreal Lacrosse Club, formulated the rules which, with slight changes, are in general use. The game was introduced into Great Britain by visiting Canadian teams, and annual championship matches are played between teams from England and Ireland. In the U. S. the game has become popular among the colleges, and is promoted by intercollegiate matches and by games with Canadian clubs.

THE CROSSE.

The game is played on a level field having such boundaries as the players may agree on. The object of the game is to carry or throw the ball with the crosse or stick, as it is more commonly called, between the opponents' goal posts. These posts are two for each side, each pair 6 ft. high and 6 ft. apart, with 125 yds. between the goals. Each goal is surrounded on the front and sides by lines called the crease, drawn 6 ft. outside the posts. The players are twelve in number, and when in position for play extend nearly across the field from goal to goal at intervals of 10 yds. from each other. The goal keeper, whose position is within the lines of the crease, is the only player who may catch or throw the ball with his hands. No player except the goal keeper may come within the lines of the crease except when the ball is there. The game requires two umpires and a referee. The position of the umpires is behind

the goals, and their duty is to determine whether or not a goal has been made by the players. The referee has general control of the game, decides on fouls and claims, and administers the rules. He may not reverse the decision of an umpire, but he may remove him.

Lactan'tius, Firmianus, also styled LUCIUS CÆCILIUS, or CÆLIUS; one of the Christian Fathers; b. about the middle of the third century, either at Firmum, Italy, or in Africa; became a distinguished orator, and one of the most learned men of his time. He settled at Nicomedia as professor of Latin eloquence, 301, became a Christian, and, having been a witness of the persecutions of the times, wrote in defense of the new religion. He was called by the Emperor Constantine to Treves as tutor to his son Crispus, and is supposed to have died there abt. 330. Lactantius was called the Christian Cicero; he wrote an important work, "Institutionum Divinarum Libri VII," and smaller treatises, "De Ira Dei" and "De Opificio Dei, vel Formatione Hominis." The famous work on the death of persecutors ("De Mortibus Persecutorum") is probably also a work of Lactantius.

Lac'tic Ac'id (*Acide nanceique* of Braconnot), the acid formed in milk when it turns sour, and existing therefore in buttermilk. It is $C_3H_6O_3$. The souring of milk is not a process of oxidation, but, like the vinous fermentation of sucrose or glucose, a breaking up into simpler compounds; lactic acid, like alcohol in the other case, being an intermediate product of decay and dissolution. Pure lactic acid is a colorless, sirupy liquid; does not freeze at 12° below zero F.; density = 1.215.

Lactom'eter, or Galactom'eter, instrument for determining whether milk has been watered; in some cases it is a mere hydrometer or specific-gravity glass; in other cases a graduated test tube, the richness of the milk being judged by the percentage of cream which appears after standing.

La'cy, Hugh de (fifth Baron and first Lord of Meath), d. 1186; English conqueror of Ireland; was the chief of the Anglo-Norman adventurers who, 1171, accompanied Henry II to Ireland. He subdued Roderick, King of Connaught, 1172; appointed Viceroy of Ireland; murdered at Durrow.

Lad'anum. See LABDANUM.

Ladinos (lä-dē'nōz), name used in Spanish America, sometimes for persons of mixed European and Indian blood, sometimes for all inhabitants who are not pure Indian.

Lad'islas, Lad'islaus, or Lance'lot (surnamed the LIBERAL and the VICTORIOUS), abt. 1375–1414; King of Naples; succeeded his father, Charles III, under the regency of his mother Margaret, 1387; driven from Naples, 1387, by his competitor, Louis II of Anjou, whom Pope Clement VII had invested with the crown. He was reinstated by Otto of Brunswick the same year; repulsed two invasions made by Pope Urban VI, 1388; crowned at Gaeta, 1390, by a legate of Boniface IX; maintained a long war in the heart of his kingdom against his rival, Louis II, who was in possession of the capital; recovered that city, 1399; candidate for the throne of Hungary, and actually crowned, 1403, but soon withdrew his claims. He attempted to seize Rome, 1405; excommunicated and deprived of his kingdom by the pope, 1406; entered Rome, 1408, retiring in a few months; after a long series of alternations of fortune again took by surprise and plundered that city, June 8, 1413. He was the earliest modern Italian ruler who conceived the project of the unity of Italy; also a claimant of the throne of Provence and a candidate for the imperial crown of Germany.

Lad'oga, lake of Russia, the largest in Europe; surrounded by the governments of Viborg, Olonetz, and St. Petersburg; length, 124 m.; greatest breadth, 87 m.; area, abt. 7,000 sq. m. It contains several islands, some of them inhabited. Its navigation is connected by rivers and canals with that of the other large lakes and of the White, Baltic, and Caspian seas.

Ladrone' Is'lands. See MARIANAS.

La'dybird (properly LADYBUG), common name for beetles of the family *Coccinellidæ*, of which there are more than 1,000 species and many genera. They are extremely useful to farmers, destroying vast numbers of aphides or plant lice; but are objects of many superstitions, and are by many viewed with a vague and unreasonable dread. They are usually of an elongated hemispherical shape, frequently have bright colors, and are often spotted.

La'dy Chap'el, in English church architecture, a chapel forming part of a cathedral or collegiate church, and dedicated to the Virgin Mary. A lady chapel is attached to nearly every English cathedral, though occasionally wanting, as at Lincoln, York, and Peterborough. It is commonly at the extreme E. end of the church, behind the sanctuary, as at Salisbury, Wells, Lichfield, Winchester.

Lady Day, March 25th, the feast of the Annunciation of the Virgin Mary. In Great Britain it is a quarter day on which rent is usually payable.

Lady Frank'lin Bay, the Arctic bay on which was located the station of the unfortunate polar expedition of the U. S. Signal Service, 1881–83. It is between Grinnell Land and Grant Land, and opens into Kennedy Channel.

La'dysmith, third largest town in Natal, S. Africa; on the Klip River, 80 m. NNW. of Maritzburg. It lies in a hollow surrounded by hills. Before the Boer War it was made a military depot. A British army of 9,000, under Gen. George White, was besieged here by the Boers, October, 1899–February 28, 1900, and relieved by Lord Dundonald. Pop. abt. 6,000.

Lady's Slip'per. See CYPRIPEDIUM.

Laeken (lä'kĕn), city of Belgium, suburb of Brussels, with a royal palace built, 1782, by

the Austrian Princess Maria Christina, which, 1806, was bought by Napoleon for Josephine. In 1811 he resided here for some time with Maria Louisa. In 1812 he exchanged it for the Elysée Bourbon. Later it became the property of Belgium. In the parish church are the tombs of Leopold I and Queen Louise. Pop. (1901) 31,346.

Laennec (lā-nĕk'), **René Théodore Hyacinthe,** 1781–1826; French physician; b. Quimper, Brittany; principal physician at the Necker Hospital, 1816; Prof. of Medicine at the Collège de France, 1822; inventor of the stethoscope.

Laertes (lā-ēr'tēz), in Greek mythology, the King of Ithaca, son of Acrisius and Chalcomedusa. He joined in the Calydonian boar hunt and the Argonautic expedition. By Anticlea he begat Ulysses (Odysseus), during whose long absence from Ithaca he remained in retirement in the country, forced to see the unseemly orgies of the suitors of Penelope. On the return of Ulysses and the murder of the suitors, he took up his abode in the palace, was rejuvenated by Athene, and fought against the people of Ithaca, who stormed the palace to avenge the death of their kinsmen, the suitors.

Laestrygones (lĕs-trĭg'ō-nēz), giant cannibals and pirates (*Odyssey*, x., 80 ff.) that lived in the Far West, where the nights were so short that "herdsman hails herdsman as he drives in his flock, and the other who drives forth answers the call," a myth in which there is probably a hint at the short, bright nights of the Far North. Four frescoes found, 1848, on the Esquiline Hill are the only pictorial representation we have of them.

Lætare (lē-tā'rē) **Sun'day,** fourth Sunday in Lent, the day on which the pope blesses the golden rose. *Lætare*, rejoice, is the first word of the introit in the missal for this day (Isa. lxvi, 10). On this day only is the organ played during Lent in Roman Catholic churches.

La Farge (lä färj'), **John,** 1835– ; American figure and landscape painter; b. New York; National Academician, 1869; member of the Society of American Artists, 1877, and of American Water Color Society; awarded a first-class medal for stained-glass work at the Paris Exposition of 1889, and received the decoration of the Legion of Honor. He has executed decorative paintings in Trinity Church, Boston; St. Thomas's Church, and the Church of the Ascension, New York, and designed and had executed under his supervision numerous stained-glass windows, including the battle window in Memorial Hall at Harvard. Author of "An Artist's Letters from Japan," "Considerations on Painting."

La Fayette (lä fä-yĕt'), **Marie Jean Paul Roch Yves Gilbert Motier** (Marquis de), 1757–1834; French soldier; b. Château Chavagnac, Auvergne, of an ancient family. His father was killed at Minden, and on his mother's death, 1770, he fell heir to large estates; married, 1774, a granddaughter of the Duc de Noailles; entered the Guards, and while a captain of dragoons, 1776, determined to join the Revolutionists in N. America. He fitted out a yacht at his own expense, and landed, April 24, 1777, near Georgetown, S. C.; served as major general, 1777–83, without pay, furnishing also clothing and camp equipage at his own expense to the needy patriots; was wounded at Brandywine, and fought with great honor at Monmouth. He was in France 1779–80, where he induced the king to send Rochambeau to N. America; conducted the campaign in Virginia, which ended in the capture of Yorktown; then returned to France; visited the U. S. again, 1784; exerted himself to procure the abolition of slavery in the French colonies, and freed and educated his own slaves at Cayenne.

He was in the Assembly of Notables, Paris, 1787; vice president of the National Assembly, commandant of Paris, and chief commander of the National Guards, which he organized, 1789. He commanded successfully the army of Flanders, 1792; denounced the Jacobins, from whom he escaped to Flanders, but was imprisoned for five years by the Austrians at Olmütz. He was liberated by Napoleon, and returned to France, 1799, but would never become a partisan of Napoleon; was in the French House of Representatives, 1815; in the Chamber of Deputies, 1818; visited the U. S., 1824–25, and received a grant of $200,000 and a township of land. In 1827 he was chosen to the Chamber of Deputies; took part in the revolution of 1830, and commanded the National Guard, but not in person. La Fayette was an ardent and consistent democrat, but was ready to sacrifice his own preferences for the advantage of the public.

Lafayette, capital of Tippecanoe Co., Ind.; on the Wabash River and the Wabash and Erie Canal; 63 m. NW. of Indianapolis; has a belt line of railway connecting its factories with the main railways; receives natural gas from wells in Tipton Co., and is the seat of Purdue Univ., the State Agricultural and Mechanical College. Near the city is the battle ground where Gen. Harrison defeated the Indians under Tecumseh, 1811. The city originally derived its chief importance from being the head of navigation on the Wabash, and then received an impetus which has sustained its growth since the abandonment of the upper Wabash as a channel of commerce. Pop. (1907) 19,238.

Lafitau (lä-fē-tō'), **Joseph François,** 1670–1746; French missionary; b. Bordeaux; was sent to Canada, 1712, where he was stationed at the Iroquois mission of Sault St. Louis, making excursions and becoming intimately acquainted with Indian character and customs; returning to France, 1717, published, 1724, "Manners of the American Savages Compared with the Manners of Primitive Ages," in which he argued for the Asiatic origin of the American race. Parkman and others regard this as the best of the early works on the Indians. Lafitau also wrote a memoir on ginseng, which he believed he had discovered in Canada.

Lafitte (lä-fīt'), **Jean** (long popularly known as the PIRATE OF THE GULF), b. France abt. 1780; first came into notice as the head of a band of privateers on the island of Grande Terre, 35 m. W. of the mouth of the Mississippi. At first he sailed as a privateer under the French flag; but later took advantage of his opportunities, and captured whatever vessels came in his way, without regard to nationality. His cargoes were sold openly at Barataria, and thither the people of Louisiana resorted for profitable purchases. He successfully evaded an expedition sent against him, 1814, under Commodore Patterson. In September, 1814, he was offered inducements to enter the service of Great Britain. Lafitte, however, sent the letters to the Governor of Louisiana, with the assurance that he would enter the service of the U. S. in case of pardon for past offenses. After some hesitation these terms were accepted. He not only was employed to occupy and defend the passes of Barataria Bay, but he fought with his men under Jackson in the battle of New Orleans, January 8, 1815. Though he was formally pardoned by Madison in a proclamation issued February 6, 1815, there are some reasons for thinking that he returned to his former life, with headquarters on Galveston Island. He is said to have died at sea, 1817; also at Silau, Yucatan, 1826.

La Fontaine (lä fôñ-tān'), **Jean de**, 1621–95; French fabulist; b. Champagne; made futile attempts to study theology and law; received from his father the latter's office of master of waters and forests at Château Thierry and was induced by him to marry, but he was equally neglectful of his matrimonial and official duties. He went to Paris, where Fouquet appointed him his poet, with an annual allowance of 1,000 livres. Several years after the fall of Fouquet, in whose behalf he repeatedly but vainly dedicated eloquent poetry to the king, he was taken up by the Duchess of Bouillon, Mazarin's niece, and the Duchess Dowager of Orleans, from whom he received a pension as her gentleman servant. After the exile of the former and the death of the latter lady, he resided for twenty years in the house of Mme. de Sablière; and ended his life under the roof of M. d'Hervart in Paris. During his last two years he performed severe penances for his objectionable publications. His fame rests on his "Fables" (1668–94), which are constantly reprinted. His "Psyché," a mythological novel, and "Adonis," a charming narrative poem, appeared 1669. His "Philémon et Baucis" and "Les filles de Minée," although intended as mere imitations of Ovid, are stamped with true originality. La Fontaine was a member of the French Academy.

Lafontaine, Sir Louis Hippolyte, 1807–64; Canadian jurist; b. Boucherville, Lower Canada; became a prominent advocate and politician; accused, 1837, of sympathy with the insurgents, a reward was offered for him, and he escaped to Europe, but was recalled, and became Premier of Canada; resigned this office, 1851; chief justice of the Queen's Bench, 1853; baronet, 1854.

La Fourche (lä fôrsh'), bayou in Louisiana; outlet of the Mississippi; begins at Donaldsonville on the right bank, and flows SE. through the parish of La Fourche Interior to the Gulf of Mexico; length, 150 m.; is navigable by steamboats for about 100 m. from its mouth, and is one of the principal channels of communication between the Gulf and the interior. Great crops of sugar and cotton are raised in the region through which this bayou flows.

Lagoa dos Patos (lä-gō'ä dōs pä'tōs), largest lake in Brazil; in the State of Rio Grande do Sul; length from NE. to SW. 144 m.; greatest breadth, 41 m.; is parallel to the Atlantic coast, from which it is separated only by a narrow region of sand dunes and swamps. At its S. end it narrows E. to a channel called the Rio Grande do Sul, 50 m. long, but only riverlike for about 20 m. above its mouth. The lake itself is mostly shallow, but there is a navigable channel for deep-draught vessels.

Lago Maggiore (lä'gō mäd-jō'rā). See MAGGIORE.

Lagos (lä'gōs), city in State of Jalisco, Mexico; 120 m. ENE. of Guadalajara; is celebrated for its fairs held in December. In the vicinity there are extensive deposits of iron ore and opal mines. Pop. (1900) 20,000.

Lagos, British territory on the Slave Coast, Gulf of Guinea, W. Africa; constituted 1901; consists of the former crown colony of Lagos (name changed to Colony of S. Nigeria, 1906) and the protectorate; colony includes Lagos Island and has an area of 3,460 sq. m.; protectorate has area of 25,450 sq. m.; est. pop. of entire territory (1901) 1,500,000; Lagos town and suburbs, 41,850. The chief productions are maize, yams, cassava, plantains, earth nuts, fruits, palm oil, gum, copal, rubber, cotton, cocoa, and coffee. Lagos was secured by Great Britain (1861) for the special purpose of giving its merchants facilities for the palm-oil trade. Until 1886 it formed a dependency of the Gold Coast. The city of Lagos, at the mouth of the Ogun River, affords the only natural harbor along 1,000 m. of the coast. Pop. (1901) 41,874.

Lagrange (lä-grāñzh'), **Joseph Louis** (Count de), 1736–1813; French geometrician and astronomer; b. Turin, Italy; became Prof. of Geometry in his native city, 1755, and with his pupils formed a scientific society whose memoirs became celebrated. In 1764 and 1766 he won academical prizes by memoirs on the libration of the moon and the satellites of Jupiter. In 1766 Frederick the Great made him mathematical director of the Prussian Academy at Berlin, as successor of Euler, and he remained there twenty years, during which he prepared his great work, "Analytical Mechanics." On the death of Frederick he went to France, where he was received as a veteran pensioner of the Academy, and provided with apartments in the Louvre. He subsequently became director of the mint in conjunction with Monge and Berthollet, professor in the normal and polytechnic schools, chief of the bureau of longitudes, senator, and count.

La Guaira (lä gwī'rä), city of Venezuela; the most important port of the republic; on the Caribbean Sea. The mountains rise precipitously from the shore, leaving a strip from 700 to 1,000 ft. wide, on which La Guaira has been built in two long streets, with outlying houses where the rocky slopes permit their erection. The port is an open roadstead, much exposed to the waves, and formerly communication between ships and shore was troublesome, and often interrupted; but in 1891 a breakwater was finished, at a cost of nearly $5,000,000, and this gives shelter to a limited number of vessels, steamers loading directly from jetties. La Guaira exports coffee, cacao, hides, etc.; is connected by cable with Cuba and Florida; was founded 1588; sacked by filibusters, 1595, and by the French, 1680; it repulsed several attacks from the British and Dutch in the eighteenth century; was completely destroyed by earthquake, 1812. Pop. (1900) 15,000.

La Harpe (lä ärp'), **Frédéric César de**, 1754–1838; Swiss patriot; b. Rolle, Vaud; was appointed tutor to her two grandsons, Alexander and Constantine, by Catharine II of Russia. His enthusiasm for the French Revolution made his stay in Russia difficult, and, 1793, he left the country, but received a pension for life, and resided partly in Geneva, partly in or near Paris, until 1814. He supported the revolution in Switzerland, 1797, that led to the establishment of the Helvetian Republic, and was a member of the Swiss Directory, 1798–1800. On his visit to Paris the Emperor Alexander received his former tutor with great esteem, made him a Russian general, and exercised through him considerable influence on the political reorganization of Switzerland.

La Harpe, Jean François de, 1739–1803; French critic; b. Paris; made his début as a poet, 1759, with a volume of "Heroïdes"; wrote "Warwick," "Timoléon," and two other tragedies; became, 1768, literary critic on the *Mercure de France*; gained several prizes from the Academy; was elected to the Academy, 1776; and, 1786, appointed Prof. of Literature at the newly established Lycée. Here large audiences gathered year after year to hear his lectures on literature, from which originated his best work, "Course in Ancient and Modern Literature," 16 vols., 1799–1805.

La Hontan (lä ōn-tän'), **Armand Louis de Delondarce de** (Baron de), abt. 1667–1715; French traveler; b. near Mont-de-Marsau; arrived in Canada as a soldier, 1683; took part in expeditions against the Indians; 1688, was sent to Michilimackinac and Sault Ste. Marie, and pretended to have discovered and explored Long River, a branch of the Mississippi, which he peopled with fictitious tribes, misleading geographers for many years; was afterwards made king's lieutenant in Newfoundland and Acadia; arrived there, 1693; got into difficulties with Governor de Brouillon, and escaped to Portugal.

Lahore', principal city of the Punjab, British India; on the Ravi; is surrounded by a high brick wall, and consists mostly of narrow, dirty, and overcrowded streets between high houses which present only bare walls toward the streets. It has many magnificent Mohammedan mosques and Hindu temples, and its extensive bazaars are well stocked. Outside the wall are other fortifications, stretching 7 m. in circuit, inclosing beautiful and luxuriant gardens and promenades, interspersed with large monuments and ruins of the former splendor of the city, when it was the residence of the Mogul emperors and had 1,000,000 inhabitants. Since 1849 it has been a British possession. Pop. (1901) 202,964. The city gives its name to a civil division of the British territory in that province, and to the headquarters district of the division.

Lahsa (läh'sä), territory in Arabia; included between Asiatic Turkey, the Persian Gulf, Oman and Nedjed; is generally sterile, hot, and without water, but dotted with oases, in which wheat, millet, fruits, and garden vegetables grow plentifully. Camels (many thousands of which are annually sold to Syria and other parts of Arabia), horses, and dates furnish the principal sources of revenue. Since 1819, when the Ottomans occupied part of the region after the war with the Wahabees, a small tribute is nominally paid the sultan. The chief towns are El-Katif and Ras-el-Khyma. Pop. abt. 160,000.

Laibach (lī'bäkh), capital of the duchy of Carniola, Austria; on a plain on a river of the same name; on the road from Vienna to Trieste; is an old town, with some manufactures, a considerable trade, many good educational institutions, and several interesting buildings; as the Cathedral of St. Nicholas, the Gothic townhouse, the castle, and the palace of Count Auersberg. The town is noted as the place where the congress of the great powers was held, 1821, to consider the revolution in Italy. Here and at Troppau, where the congress began its sessions, the policy of the Holy Alliance was fully carried out. Pop. (1900) 36,547.

Laing, Malcolm, 1762–1818; Scottish historian; b. Orkneys; called to the bar, 1785, but applied himself chiefly to literature. His first work was a continuation of Dr. Henry's "History of Great Britain," which was followed, 1800, by a "History of Scotland, from the Union of the Crowns to the Union of the Kingdoms." He also published the "History and Life of King James VI," from the original manuscript, which had served as the foundation of the forgeries of Crawfurd in his "Memoirs of the Affairs of Scotland."

Laissez-faire (lä-sä-fär'), in economics, a term applied to the theory that a public authority should interfere in the concerns of a community as little as possible; that wealth tends to be produced most amply and economically where a government leaves individuals free to produce and transfer on mutually arranged terms, confining itself to the protection of property and person and the enforcement of contracts. This rule in practice is limited by

various exceptions, as in government interference in the matters of education and the employment of children; in the promotion of health or morality; and in the private economic interests of certain industrial classes.

Lajard (lä-zhär'), **Jean Baptiste Félix,** 1783–1858; French archæologist; b. Lyons; accompanied as secretary a mission to Persia, 1807; became interested in the study of Oriental religions and Oriental influences on ancient Greece, and made a fine collection of cuneiform cylinders, which were obtained by the Imperial Library. He occupied diplomatic posts in Persia, Greece, Russia, and Denmark; and was elected, 1830, to the Academy of Inscriptions. Of his numerous writings, the most important is the "Researches Into the Public Worship and the Mysteries of Mithra in the East and West."

Lake, Gerard (Viscount), 1744–1808; British general; b. England; entered the army, 1758; served in the closing campaigns of the Seven Years' War, in the American War (1781), and in Holland under the Duke of York, 1793–94; was commander in chief in Ireland during the insurrection of 1797–98; defeated the rebels and recovered Wexford, June 21st; defeated the French troops under Humbert at Killala, September 8th; was made commander in chief in India, 1800. He conducted the Mahratta War (1803) with brilliant success, taking Delhi (September 12th), Agra (October 17th), and winning the decisive victory of Laswari (November 1st), which brought the Mogul Emperor into vassalage to Great Britain, for which he was made (1804) Baron Lake of Delhi and Laswari. He defeated Holkar near Bharatpur, 1805; returning to England, 1807, was made viscount, and appointed Governor of Plymouth.

Lake, pigment prepared from infusions of vegetable dyes or of cochineal, by causing the coloring matter to unite and form a precipitate with some earthy or metallic oxide. This is usually alumina, but the oxides of tin and zinc sometimes serve as the basis. A solution of alum is employed to furnish the alumina, and potash is commonly added to it—always if the infusions are acid. Lakes are of many tints, as crimson, green, orange, pink, yellow, etc.

Lake Dwell'ings, class of prehistoric habitations existing in some form in various parts of the world, but found in greatest perfection and most thoroughly explored in Switzerland. Those who inhabited them are called lacustrians. In Scotland and Ireland such remains are called crannoges. They are of two kinds—fascine dwellings and pile dwellings. The former were built on a foundation of reeds or tree stems, woven together in horizontal layers alternated with layers of clay or gravel, the whole mass sunk in the water and kept in place by a few stakes or piles. The pile dwellings were built on platforms supported by piles driven deeply into the lake bottom, but projecting above the water. The fascine dwellings were commonly used in the smaller lakes and where the bottom was too soft to hold piles firmly, while the pile dwellings were constructed in the large lakes where the

LAKE DWELLINGS (RESTORED).

waves would have swept away a foundation of fascines. The lake dwellings of extinct peoples represent all stages of civilization from the age of stone to the dawn of the iron age. Those of Lake Moosseedorf, Switzerland, are supposed to be the oldest, and those of Ireland

BONE, FLINT, AND WOODEN IMPLEMENTS FROM MOOSSEDORF.

1. Knife of boar's tooth. 2. Bone chisel. 3. Bone knife. 4. Bone awl. 5. Flint saw in handle of fir wood. 6. Harpoon of stag's horn. 7. Comb of yew wood. 8. Wedge of fir wood. 9. Fish-hook of boar's tusk. 10, 11. Needles of boar's tusk.

the most recent. The frequency of such dwellings about Lake Maracaibo and other parts of Venezuela earned for that region the name of "Little Venice." The antiquity of the older

bronze-age villages has been estimated at from 3,000 to 4,000 years, while the stone-age villages are thought to reach back 6,000 or 7,000 years.

Lake Le'opold II, one of the fourteen administrative districts into which the Kongo Independent State is divided. The lake which gives it its name was discovered by Stanley, 1882; is shallow; has an area of nearly 800 sq. m.; sends its waters to the Kassai and Kongo through the Mfini River.

Lake of the Woods, large lake on the boundary between Minnesota and Canada. A small detached portion of Minnesota lies on its NW. side. Its principal affluent is Rainy River, and its waters flow N., through the Winnipeg River, into Lake Winnipeg. It contains many small wooded islands, formed by inequalities in the drift-covered surface which it occupies. Area, 1,851 sq. m.

Lake Po'ets, name given by *The Edinburgh Review* to a number of English poets, of whom Coleridge, Wordsworth, and Southey were the most important, who at the beginning of the nineteenth century lived in the lake region of Westmoreland and Cumberland, England.

Laksh'mi, in Hindu mythology, the goddess of beauty and good luck, the consort of Vishnu the Preserver, the mother of Kāma, the god of love; is said to have sprung in the full perfection of maidenly beauty from the foam of the sea, as is said of Aphrodite. Her attendant, like that of Minerva, is the owl. As the goddess of abundance and fertility, she is worshiped by agricultural laborers, the worship consisting of offerings of flowers and grain. She is frequently represented as reclining at the feet of Vishnu.

Lalande (lä-länd'), **Joseph Jerome le Français de,** 1732-1807; French astronomer; b. Bourg en Bresse, Ain; was sent to Berlin to make observations complementary to those made by La Caille at the Cape of Good Hope concerning the distance between the earth and the moon, 1751; was appointed Prof. of Astronomy at the Collège de France and Director of the Observatory at Paris, 1762; conducted the *Connaissance de Temps*, 1760-75 and 1794-1807; his success in diffusing astronomical knowledge and interest was remarkable; chief work, "Treatise on Astronomy," which exceeded in utility all previous works on the subject.

La'maism, corrupt form of Buddhism which prevails in Tibet and Mongolia and a great part of Tartary. Its chief characteristic is the worship of grand lamas, in whom Buddha is supposed to be incarnate. These priest-gods are very numerous, every lamasery or monastery of note having one at its head. The most important are the *Grycira Rin-po-chhé*, or *Dalai Lama*, at Lhassa; the *Pan-ara Rin-po-chhe*, at Tashilumbo, in Farther Tibet; the *Guison Tamba*, at the lamasery of the Great Kuren, on the river Tula; the *Chang-Kia-Fo*, at Peking; and the *Sa Dcha-Fo*, at the foot of the Himalayas. After the grand lamas rank the khutuktus, or incarnations of celebrated Buddhistic saints; and next to these in the lamaic hierarchy come the khubilghans, in whom dwell the souls of former patrons or founders of lamaseries. The lower classes of lamas are incarnations of nobody in particular, and gain consideration only by superior learning or talents; among them, therefore, are found scholars, scribes, artists, physicians and sorcerers, prayer makers, and artisans. They form a large proportion of the population—about one third, according to M. Hue.

A lamasery or monastery consists of numerous houses or huts built around a temple. The lamas have no common refectory, but live according to their wealth, which is sometimes considerable. Those who have reached a certain rank as theological scholars receive an allowance from the endowment. Some are paid liberally by the faithful for their services as physicians, exorcists, or intercessors for departed souls. Others engage in trade or transcribe the sacred writings. Lamai temples are built in the Indo-Chinese style, and are profusely adorned with paintings and sculptures. Opposite the principal entrance is a broad flight of steps surmounted by an altar, upon which are the images. In front of the chief idol, and hardly more lifelike than it, sits the living Buddha. Besides the monk lamas, there are hermits who inhabit cells or caves and spend their time in contemplation; also a large class of wandering lamas, who receive everywhere a welcome as ready as that given in Europe to the itinerant friars of the Middle Ages. Female lamas, or nuns, are also found. Their number, however, is comparatively small.

Lamas'tin. See MANATEE.

Lamar', **Lucius Quintus Cincinnatus,** 1825-93; American jurist; b. Jasper Co., Ga.; admitted to the bar in Macon, 1847; settled in Oxford, Miss., 1849; member of Congress, 1856-61; served in the Confederate army till 1863; then went on a diplomatic mission to Russia. He became Prof. of Political Economy and Social Science in the Univ. of Mississippi, 1866, and of Law, 1867; member of Congress, 1873-77; U. S. Senator, 1877-85; resigned to become Secretary of the Interior; and was appointed an associate justice of the U. S. Supreme Court, 1887. His speech on the death of Charles Sumner was one of the most eloquent ever delivered in the U. S. House of Representatives.

Lamar, **Mirabeau Buonaparte,** 1798-1859; American politician; b. Louisville, Ga.; become a merchant and planter; removed, 1835, to Texas, where he was distinguished at the battle of San Jacinto; became a major general, Attorney-general, and Secretary of War; and was, 1838-41, President of Texas. In 1846 he fought at Monterey and on the Comanche frontier; was appointed U. S. Minister to the Argentine Republic, 1857, and to Costa Rica and Nicaragua, 1858.

Lamarck', **Jean Baptiste Pierre Antoine de Monet de,** 1744-1829; French naturalist; b. Bazentin; having gained some reputation as a

physicist and botanist, he was intrusted with the department of invertebrata in the Museum of Natural History in Paris, 1793. In 1809 appeared his "Philosophie zoölogique," in which his theory of the development of animal functions is set forth at length. It was his opinion that new organs could be produced in animals by the simple exertion of the will, called into action by the creation of new wants; and that the organs thus acquired could be transmitted by generation. He was an advocate also of spontaneous generation, and is considered by some as the originator of the theory of the variation of species, which Darwin developed. His "Natural History of Invertebrate Animals" was pronounced one of the noblest monuments of human science.

La Mar'mora, or Lamar'mora, Albert (Count de), 1789–1863; Italian soldier and naturalist; b. Turin; received his military education in France; served in Calabria, then in Lombardy, afterwards in Austria; at Bautzen was decorated by Napoleon I; fought at Leipzig; was made prisoner at Torgau, and released in time to join the Sardinian forces at Grenoble, 1814. Having taken part in the revolutionary movement of 1821, he was banished to the island of Sardinia, where he spent nine years in studying the island, especially its geology. He was recalled, 1831, by Charles Albert, and his military rank was raised. In 1848 he went to Venice to assist Manin; afterwards was sent to Sardinia as royal commissioner, and calmed the passions of the Separatist party. His "Travels in Sardinia" is highly esteemed.

La Marmora, Alfonso Ferrero (Marquis de), 1804–78; Italian general; b. Turin; brother of the preceding; introduced reforms in the Sardinian army; served against Austria, 1848; aided in restoring order after the defeat of Novara, 1849; commanded the Sardinian forces in the Crimea; was the king's chief military adviser in the campaign of 1859; and acted at various periods as Minister of War and Marine, and as a diplomatist. He was chief of the cabinet during the temporary retirement of Cavour after the peace of Villafranca, and was again Premier, 1864–66, when, after concluding through Gen. Govone the alliance with Prussia, he took command of the army as chief of staff, and was held responsible for the defeat at Custozza (June 24th). In 1873 he published a volume of diplomatic memoirs, in which he said that Bismarck in his negotiations with General Govone, 1866, declared himself willing to cede part of Transrhenan Germany to Napoleon to propitiate him, in view of the impending war with Austria. This elicited many comments, and a vehement denial from Bismarck.

Lamarque (lä-märk'), **Maximilien** (Count), 1770–1832; French general; b. St. Sever; distinguished himself in Spain, at Hohenlinden, and at Austerlitz, shared in the invasion of Naples, smothered the insurrection in Calabria, took Capri from Sir Hudson Lowe (1808), fought bravely at Wagram, and led the rear guard when the French evacuated Spain. He was exiled after the second restoration, as he had rejoined Napoleon; was allowed to return, 1818; became a deputy, 1828; 1830, was one of the 221 members who boldly denounced Charles X, but after the accession of Louis Philippe bitterly opposed his policy of "peace at any price." His honesty of purpose and martial eloquence gained him great popularity, and his funeral (June 5, 1832) became the signal for a formidable insurrection, which was quelled only after nearly forty-eight hours of bloodshed.

Lamartine (lä-mär-tēn'), **Alphonse Marie Louis de,** 1790–1869; French poet and statesman; b. Macon; served in the royal bodyguard, but resigned after the battle of Waterloo; published, 1820, "Poetical Meditations," which procured him appointment in the diplomatic service at Naples. In 1823 appeared his "New Poetical Meditations"; in 1825, a continuation of Byron's "Childe Harold's Pilgrimage"; in 1830, "Poetic and Religious Harmonies." He was elected from Bergues to the Assembly, to which he was returned later from Lyons, and soon won fame and power as a political orator. In 1847 he published his most important prose work, the "History of the Girondists," which became at once an influence. For a few months, in 1848, he was Minister of Foreign Affairs in the provisional government, and then dropped into obscurity. His later works include "History of the Revolution of 1848," "History of Turkey," "Confidences," "New Confidences," "Geneviève," a novel.

Lamb, Charles, 1775–1834; English essayist; b. London; was educated at the School of Christ's Hospital; in 1789 obtained a clerkship in the South Sea House. From 1792–1825 was an accountant in the office of the E. India Company, from which he retired on a pension. There was a tendency to insanity in the family, which manifested itself in Charles for a short time, 1795, and his sister Mary the next year, when she killed her mother. Lamb published, 1797, a small volume of verses written by himself, Coleridge, and Charles Lloyd; 1807, "Tales from Shakespeare"; 1808, "Specimens of English Dramatic Poets Who Lived About the Time of Shakespeare"; 1801, 1806, a tragedy and a farce—"John Woodvil" and "Mr. H—"—neither of which had success. After contributing brilliant essays to Leigh Hunt's "Reflector," he, in 1820, began the "Essays of Elia" in the *London Magazine*. These, published 1823, established his reputation as one of the most thoughtful as well as brilliant of humorists. In 1833 he added the "Last Essays of Elia." MARY ANN LAMB, 1765–1847, was a woman of considerable literary talent, and took part in some of her brother's works, especially the "Tales from Shakespeare."

Lamber (läṅ-bā'), **Juliette.** See ADAM, MME. EDMOND.

Lam'bert, Johann Heinrich, 1728–77; German natural philosopher; b. Mühlhausen, Alsace; was successively a copying clerk, secretary of a journal at Basel, and private tutor in Coire.

and became, 1770, superior councilor of the Board of Works at Berlin, and, 1774, superintendent of the "Astronomical Almanac." The measurement of the intensity of light was first reduced to a science in his "Photometria, sive de Gradibus Luminus"; the theory of refraction was developed in "Les propriétés remarquables de la route de la lumière par les airs"; and his chief work in philosophy is "New Organon; or, Thoughts on the Research of Truth."

Lambert, John, 1619–83; English general; b. Kirkby Malhamdale, Yorkshire; entered the Parliamentary army under Fairfax; was colonel at Marston Moor, 1644, and major general in the Scots War, 1650, in which he gained the actions of Hamilton and Inverkeithing; Lord Deputy of Ireland, 1652; member of Cromwell's council and Parliament, 1654; but opposed Cromwell's assumption of sovereign power, 1657, refusing to take the oath of allegiance, and was dismissed with a pension. In May, 1659, he was instrumental in the reinstallation of the Rump Parliament; defeated the royalists at Chester; dispersed the Rump in October, thereby becoming head of the committee of safety and virtual ruler of England. Lambert started with an army to oppose Monk (November), but, the troops deserting, he was seized by order of Parliament (January, 1660) and sent to the Tower, whence he escaped and reassembled forces against Monk; captured a second time, he was condemned to death (June, 1662), but his sentence was commuted to banishment.

Lam'beth, suburb of London, on the Thames, opposite Westminster, with which it is connected by the Waterloo, Westminster, Lambeth, and Vauxhall bridges; is a parliamentary borough and returns four members of the House of Commons. Lambeth Palace, an edifice of the Middle Ages, has been for centuries the principal residence of the Archbishops of Canterbury, and has a library of 30,000 books and 14,000 manuscripts, and a series of portraits of the archbishops, some of whom are buried here. The so-called Lollards' Tower (dating from 1434) of the palace derived its title from the notion that heretics were formerly confined in it, and was in reality a water tower. St. Thomas's Hospital (built at a cost of £500,000), one of the great London hospitals, stands on the Albert embankment, facing the Houses of Parliament, and treats about 70,000 indoor and outdoor patients annually. The celebrated Doulton pottery works are also situated here, and hat making, engineering, and glass making are extensively carried on. Pop. (1901) 301,873.

Lamennais (lä-mĕn-nā'), **Hugues Félicité Robert** (Abbé de), 1782–1852; French politico-religious writer; b. St.-Malo; took holy orders, 1817; published "An Essay on Indifference in Religion," 1817–20; a brilliant apology for the Church and the monarchy; "Religion in its Relations with Civil and Political Order," 1825–26, "Progress of the Revolution and War Against the Church," 1829, developing his idealization of the existing Church and monarchy with a tendency toward reform of both. After the July revolution of 1830 he openly broke with the old monarchy and tried in his journal *L'Avenir*, to establish an alliance between the Church and free constitutional government. The pope condemned his views, and *L'Avenir* was suspended; but, 1834, Lamennais published "Words of a Believer," which ran through 100 editions in a few years. The pope condemned it, and Lamennais answered in "Affairs of Rome." By these two books he broke absolutely with the Church, and in his subsequent works, "The Book of the People," "The Guide of the First Age," etc., he appeared as the prophetic expounder of the alliance between Christianity and radicalism. In 1849 he was a member of the Constituent Assembly.

Lamenta'tions, Book of, a canonical book of the Old Testament, following the Book of Jeremiah, and generally attributed to that prophet. It consists of five chapters. Each is composed of twenty-two verses (except the third, which has sixty-six), according to the number of letters in the Hebrew alphabet, and is an acrostic, each verse beginning with a distinct letter. The contents are a series of dirges or threnodies upon the downfall of Israel. Little opposition has been made by modern critics to the tradition derived from the Septuagint text and supported by the Talmud, which refers its authorship to Jeremiah, treating it as an appendix to the prophecies.

Lamia (lā'mĭ-ä), in classical mythology, a beautiful Queen of Libya, whom Hera robbed of her children because she was beloved by Zeus. Hera made of her an ugly witch, who went about strangling all the children she could find. The name included numerous hobgoblins who, vampirelike, sucked the blood of young men.

La'mian War, war waged, 323–22 B.C., between the Macedonians and the Athenians and the Greek allies; caused by a decree of Alexander the Great, allowing all political exiles to return to Greece and promising to use force should any state refuse to comply with his wishes. After his death, Athens and Ætolia determined to resist the return of so many dangerous persons. The chief events of the war were the siege of Lamia (held by Antipater) by the confederates; the battle of Crannon, 322, which disheartened the Greeks; the march of Antipater on Athens, and the humiliation of that city, condemned to pay the cost of the war, to suffer a reduction of the number of its citizens, and to lose, by execution, its patriotic orators.

Lam'mas Day, festival of St. Peter's chains (August 1st), probably so called because it was an ancient practice on this day to make an offering of bread as first fruits of the year; hence Lammas for Old English hlāfmæsse, *i.e.*, loaf mass.

Lammergeier (lăm'mĕr-gī-ĕr), bird of prey having the appearance of an eagle and the

habits of a vulture; found in the mountainous portions of S. Europe and central Asia. The

LAMMERGEIER.

length is a little under 3½ ft., the spread of wing about 10 ft.

Lam'mermoor Hills, range of hills, 1,732 ft. high, forming the boundary between E. Lothian and Berwickshire, Scotland, and covering the SE. part of the latter county, where it presents a bold, rocky, and dangerous coast to the North Sea.

Lamotte-Valois (lä-mŏt'-väl-wä'), **Jeanne de Luz de St. Remy** (Countess de), abt. 1756–91; French adventuress; b. probably Bar-sur-Aube. After marrying a Count de Lamotte, she ingratiated herself with Marie Antoinette and Cardinal de Rohan, whom she induced to believe that the queen might reciprocate his affection if he were to present her with a certain magnificent diamond necklace, valued at 1,600,000 fr. She induced one Mlle. d'Oliva, who resembled Marie Antoinette, to personate her at a midnight interview with Rohan in the gardens of Versailles. With the real signature of Rohan and a forged one of the queen, she secured the necklace (February 2, 1786), sold it in London, and for several months concealed the robbery by producing forged notes apparently written by the queen in acknowledgment of the necklace. Finally, in a public trial, the cardinal was discharged from all accusation, while the countess was sentenced to be whipped, branded on the shoulder, and imprisoned for life. She escaped, however, June 5, 1787, and fled to London.

Lamp, contrivance for providing light by burning some liquid, which is raised to the flame by means of a wick, and so burned slowly and regularly. The simplest lamp is a mere bowl or saucer, in which a wick is dipped; this sometimes floats in the combustible liquid, being held up to the surface at one end by a floating ring or disk, and sometimes lies on the edge of the vessel in a groove, or corrugation, or spout made for the purpose. The lamps which hang in the mosques of Damascus and Cairo, often of splendid enameled glass or Persian decorated pottery, are of the former kind, as are the silver and brass ones so numerous in the larger Roman Catholic churches of Europe. The Greek and Roman lamps were generally of the other sort. They exist by thousands in museums, occasionally richly adorned, but much more commonly made in the cheapest way of common pottery. The bronze lamps of Etruscan make are sometimes very richly adorned with relief sculptures. Some have several wicks; one in the Museum of Cortona has sixteen, surrounding a central reservoir; this one was intended to be hung from the ceiling or from a projecting arm, as it has no foot, and the under side is richly adorned. Some bronze lamps found in Pompeii, and now in the Naples Museum, are far more delicately and tastefully made than the Etruscan specimens. One large one at Naples has a beautiful stand of bronze about 6 in. high, evidently intended to rest on a table, and to raise the low and flat lamps to a convenient height for reading.

ROMAN LAMP.

Among the Romans of means it was more general to rest the lamp on or to hang it from a candelabrum. It is not known that the ancients had any means of increasing the light, steadying the flame, or preventing smoking, such as the modern lamp chimney. The simplest form of the lamp adopted by the ancients was a low, oval, metallic vessel, furnished with a handle at one end and a beak at the other holding the wick. The first improvement in the construction of lamps was removing the beak by a long neck to a distance from the reservoir of oil, thus reducing the width of the shadow cast by the lamp. The next was in making the wick flat, so as to bring the greatest amount of oil into sufficiently active combustion to give the greatest number of incandescent carbon particles. A greater improvement was that of the Argand burner, in which the wick was made in the form of a hollow cylinder, and so arranged that a current of air could pass up within it, as well as come to its external surface. The addition of a chimney of sheet iron, as originally made by Argand, increased the supply of air by producing an upward draught.

DAVY'S SAFETY LAMP.

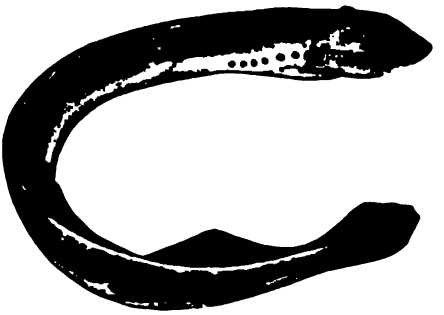
The explosive mixture of light carburetted hydrogen and atmospheric air which is often present in coal mines long made it desirable

to procure some kind of device by which the ignition of the compound might be avoided. This necessity led to the invention in 1813, by Dr. W. R. Clanny, of Sunderland, England, of the first true safety lamp. In this the communication with the external air was intercepted by water, through which the air was made to pass. This apparatus proved too cumbrous for general use. In 1815 George Stephenson and Sir Humphry Davy both invented safety lamps on other principles. In the Davy lamp the wire-gauze cylinder, through which the air was admitted, served also for the passage of the light, and when composed of wire $\frac{1}{60}$ to $\frac{1}{40}$ of an inch in diameter, and with 28 wires or 784 apertures to the inch, proved a perfect obstruction to the flame in the most explosive mixture, unless these were blown in currents through the gauze, or the lamp was carried rapidly through the gas. The Davy lamp was a wonderful achievement in its day, but it has since been greatly modified to insure greater safety in mining operations.

Lampadedro'mia, ancient Grecian torch race, originally intended to commemorate the bringing of fire from heaven by Prometheus. Several files, with several relays of racers in each file, competed with each other for the prize. Each runner had to maintain a high rate of speed, and hand over the torch still lighted to the next runner in his file. The last runner in a given file who first reached the goal with his torch lighted gained the victory for his file, so that he was spoken of as the first and last runner. This race was the most popular festival at Athens, as well as throughout the Greek world, for it was held in honor of all the fire and light gods.

Lamp'black, term applied technically to carbonaceous powdery matters deposited during the imperfect combustion of carburetted gases or vapors. The quality, both as regards fineness and color, for use in pigments, blacking, and printing inks, varies greatly with the materials burned and with the methods employed.

Lam'prey, common name of the *Petromyzontidæ*, cartilaginous fishes of the group *Hyperoartia*, class *Marsipobranchii*, having an



LAMPREY.

eellike body, a round, sucking mouth with numerous teeth, and seven round gill holes on each side of the neck. Europe has two abundant species, the *Petromyzon marinus* and *Lampetra fluviatilis*; the U. S. have a number of species.

Lancaster (lănk'ăs-tėr), House of. See ENGLAND; JOHN OF GAUNT; HENRY IV, V, and VI.

Lancaster, Sir James, abt. 1550–1620; English navigator; sailed from Plymouth, 1591, with three vessels; visited Ceylon and Sumatra, dispossessed the Spanish and Portuguese trade. He commanded the first expedition sent out by the English East India Company, sailing from Torbay, 1601, with five vessels, and returning to England, 1603. Lancaster Sound, Baffins Bay, was named in his honor.

Lancaster, Joseph, 1778–1838; English educator; b. London; introduced in Great Britain schools for poor children, on the principle of mutual instruction; and the system, known by his name, has been successfully introduced in other countries; removed to the U. S., 1818, and died in New York; published "Improvement in Education" and several elementary school books.

Lancaster, capital of Lancashire, England; on the Lune, near its mouth; 51½ m. NNW. of Manchester; is a neatly built town, with an old castle, a fine aqueduct, which carries the Lancaster Canal across the Lune, and manufactures of furniture, leather, and cast-iron work. Pop. (1901) 40,330.

Lancaster, capital of Lancaster Co., Pa., on Conestoga River; 36 m. ESE. of Harrisburg; settled, 1729; state capital, 1799–1812; incorporated as a city, 1818. It is in a rich wheat, tobacco, and limestone region, and is noted for its manufactures, which include cigars and cigarettes, umbrellas and canes, foundry and machine-shop products, malt liquors, carriages and wagons, and confectionery, and represented, 1905, a capital investment of $12,394,854 and an output value of $14,647,681. The city is the seat of Franklin and Marshall College (German Reformed, organized 1852), which comprises a college of liberal arts, a preparatory academy, and a theological seminary. The city also contains the Lancaster, County, and St. Joseph's hospitals, Children's Home, Mechanics' and Y. M. C. A. libraries, and Conestoga, a noteworthy public park. In 1777, during the occupation of Philadelphia by the British, the Continental Congress held its sessions in Lancaster, and, 1818–25, the city was the largest inland one in the U. S. Pop. (1906) 47,129.

LANCE.

Lancaster Sound, body of water leading from Baffins Bay to Barrow Strait, between the island of N. Devon on its N. side and several minor islands on its S.; is 250 m. long; forms the entrance to the Northwestern Passage; and was discovered, 1616, by Baffin.

Lance, thrusting weapon, designed to be used in the hand, and not thrown as a dart or

javelin. It derives its principal effect from the velocity of attack, and for this reason is used by mounted men only. It was the favorite weapon of the knights, and as used by them was sometimes 20 ft. long and correspondingly heavy. The modern lance is usually from 10 to 12 ft. long, the handle of hollow steel or tough wood, and the blade of steel about a foot long. A small flag or pennant is fixed on the handle near the head. The lance has been in part replaced by the saber in the Russian Cossack regiments. On the other hand, it has been adopted in Germany as the principal arm of the cavalry, and is carried by all mounted troops. It is used to a greater or less extent by other European armies, being useful in the pursuit of a retreating enemy.

Lan'cet Win'dow, name applied to the long, narrow-pointed windows characteristic of the ecclesiastical architecture of England in the first half of the thirteenth century. With the introduction of the pointed arch early in that century, these tall and narrow windows, often without a single embellishment to their deep and flaring jambs, gradually took the place of the shorter and broader round-arched windows of the Norman style. They were used singly, in pairs, or in threes, except in a few cases where five are grouped together, as in the Five Sisters in York Cathedral.

LANCET WINDOW.

Lanciani (län-chä'nē), **Rodolfo Amedeo,** 1847– ; Italian archæologist; b. Rome; became secretary of the archæological committee of Rome, 1872; vice director of the Kircherian Museum, 1875; director of excavations, 1877; and Prof. of Roman Topography in the Univ. of Rome, 1878. His published works number more than 400, and include "Aqueducts of Rome," "Ancient Rome in the Light of Recent Discoveries," "Pagan and Christian Rome."

Lan'der, Richard, 1804–34; English explorer; b. Truro, Cornwall; accompanied Clapperton as his servant to Sokoto. There Clapperton died, and Lander, returning to England, published an account of the expedition. The British Govt. then intrusted to him and his brother John (1807–39) the prosecution of further researches along the lower course of the Niger. In 1830 they proved that the Quorra, or Niger, falls by many mouths into the Bight of Benin. They published a "Journal of an Expedition to Explore the Niger," 3 vols., 1832. In the course of a third expedition in the same quarter Richard Lander was wounded by the Niger natives and died in Fernando Po.

Land League, popular organization for agrarian agitation in Ireland; formed in Dublin, 1879, by prominent Irishmen under the lead of Charles Stewart Parnell, who had just assumed the leadership of the Home Rule Party. The plan of the leaders contemplated the establishment of affiliated branches in Great Britain, the U. S., and wherever else the Irish spirit was strong. The constitution of the league excluded from membership anyone who took a farm from which another had been evicted for nonpayment of unjust rent, or which had been surrendered on grounds of excessive rent, as well as anyone who took part in any process of eviction, or who purchased stock or produce seized for nonpayment of rack-rent. The league everywhere worked for the prevention of evictions and for the reduction of rents, and as its membership grew it became the real arbiter of all questions between landlords and tenants.

Confiscation of landlord's rights was not advocated; but the transference of those rights to the tenants with fair compensation, and the establishment thus of a peasant proprietary, were declared to be indispensable to the prosperity of the land. On the lines thus laid down the Land League soon became a formidable organization. Agrarian disturbances became serious, and Mr. Forster, the Irish secretary, found it practically impossible to enforce the laws in the face of the hostile influences which developed under cover of the league's authority. In 1880 the government instituted a prosecution on charges of conspiracy against Parnell and other leaders of the league, but failed to secure a conviction.

In May, 1881, Parliament passed coercion bills which enabled it to contend on rather more even terms, but with scarcely greater success, against the movement; and in August following enacted a land bill, which, while immensely bettering the legal position of tenants, fell far short of the abolition of landlordism. While a part of the less extreme element in the Land League was disposed to accept the concessions obtained by the law, and to suspend the agitation, a convention of the organization at Dublin, in September, indorsed the policy recommended by Parnell, to test the utility of the act for getting reduced rents, but, until a favorable result from the test cases should be secured, to maintain the attitude of resistance to the landlords. This action sealed the doom of the Land League. The arrest of Parnell, Davitt, Dillon, Sexton, and other leaders followed. The prisoners promptly played their last card by issuing from the jail the famous manifesto calling on their followers to refuse entirely the payment of rent to the landlords. As promptly followed the government's proclamation, October 18th, declaring the Land League an unlawful body, and decreeing its suppression. Agrarian agitation continued in a less systematic form to disturb Ireland, and a year later the programme of the Land League, together with that of Home Rule, was incorporated in the constitution of the Irish National League, which, under Parnell's leadership, achieved many of the objects of the earlier association.

Land'lord and Ten'ant, popularly, the owner of land and one who is, by agreement with the owner and subject to the latter's title, entitled to the temporary possession of the land. The term "owner" is used in a very relative sense, however, as anyone who has an estate in lands, whether it be a fee simple, a life estate, or merely a leasehold, may be a landlord; the only requisite to the existence of the relation being that the landlord shall have some por-

tion or fragment of his estate left after the termination of his tenant's estate. The estate or interest of the tenant is called a "term"; that which remains to the landlord is known as the "reversion," being that interest in, or remnant of, the estate which returns or "reverts" to him when the tenant's term comes to an end.

The relation of landlord and tenant once constituted, a variety of rights and obligations at once arises. These exist independently of any express agreement between the parties and may be and usually are supplemented by others created by contract. The obligations which spring naturally out of the relation of landlord and tenant, without express agreement, may be briefly considered. The principal ones are, on the part of the landlord, to secure the tenant in the quiet enjoyment of the premises; on the part of the tenant, (1) to pay rent, (2) to commit no waste, (3) to keep the premises in repair, and (4) to render up possession at the end of the term. The "covenant for quiet enjoyment" does not mean that the landlord guarantees his tenant against all wrongful disturbance of his possession, but only against all acts of the landlord himself, or those claiming under him (as his heir or grantee), or of any person asserting a paramount title.

A disturbance of the tenant's possession by any one of these persons is an "eviction," and entitles the tenant to consider the tenancy at an end. An eviction may either be partial or total. The former does not necessarily discharge the tenant absolutely. He may still be liable to perform in part the obligations of the lease. Thus if a landlord should lease two houses for a gross rent, and the tenant should be evicted from one of them by a person having a better title, rent would still be due for that portion of the premises actually enjoyed by the tenant. This rule does not apply to a partial eviction by the wrongful act of the landlord. In this case the entire rent is suspended while the eviction continues, as he is guilty of a breach of his portion of the contract. The mere deterioration of the premises in value is no eviction. Accordingly, if one hires a house and lot, and the building is accidentally destroyed by fire, the tenant cannot, by the rules of the common law, leave the premises and cease to pay rent. The land still remains, and by legal theory the rent is indivisible and cannot be apportioned. There may be a clause inserted in the lease that on the buildings becoming untenantable the tenant may abandon the premises and be relieved from liability. The same result is attained in some of the states by statute modifying the common law.

Landon (lăn-dŏn'), **Charles Paul, 1760–1826;** a French painter and author; b. Monant; writings include "Annals of the Musée and of the Modern School of Fine Arts," twenty-nine volumes, 1801 17; "Landscapes and Genre Paintings in the Musée Napoléon," four volumes, 1805 08; "The Salons of 1808–24," thirteen volumes; "Selections of Paintings and Statues in the Most Celebrated Foreign Museums and Cabinets," twelve volumes, 1821 sq.

Lan'dor, Walter Savage, 1775–1864; English author; b. Ipsley Court, Warwickshire; was the son of wealthy parents; studied law, though never called to the bar; raised a body of troops at his own expense, 1808, and served under the Spanish Gen. Blake against the French invasion of the Peninsula; contributed a large sum to the Spanish military treasury, and received a commission as colonel. In 1815 he settled in Florence, Italy, and did not return to England till 1835. His works include "Count Julian: a Tragedy," "Idyllia Heroica," "Imaginary Conversations of Literary Men and Statesmen," "Pericles and Aspasia," "Andrea of Hungary," a drama; "Popery, British and Foreign," "The Last Fruit of an Old Tree."

Land'scape Gar'dening, or **Landscape Ar'chitecture,** art of making such changes in the character of the scenery of a given field, and of so bringing it under contemplation from innumerable points, that the pleasure of the beholder is increased. To this end artificial objects, such as houses, monuments, bridges, and roads, are to be so fashioned and disposed in harmony with natural objects—as masses of foliage, hills, dales, rocks, and waters—that the mind will be drawn from materialistic toward poetic moods. The term landscape gardening was introduced late in the eighteenth century. The term landscape architecture as a substitute for landscape gardening has grown in favor.

There are two branches of horticulture which in ordinary practice are often confounded with landscape gardening. One of them is the cultivation of plants with special regard to their distinctive individual qualities. The other is the cultivation of plants with a view to the production of effects as parts of a landscape so that the garden will not be a discordant feature in the general scenery of the neighborhood. The ancient formal style of gardening, in which each tree was so trained that its foliage had a distinct outline, continued to be practiced in Italy during the period of the Renaissance, and was maintained in other parts of Europe. Characteristic examples of grounds laid out in geometric style, as it is sometimes called, are yet to be found at Rome. Groves, clipped hedges, parterres, fountains, grottoes, staircases, terraces—all bore "a direct relation to the house." Another example of this style is that at Fontainebleau, France, where a garden of several acres has its parterres arranged in rectangular form surrounding a central basin of water.

With progress in civilization exceptions to the general sentiment in regard to natural scenery begin to be more or less apparent in literature. At length Milton is found imagining the Garden of Eden to have been charming, not because of its orderly, artificial character, but because of its natural landscape. The literature of the early parts of the eighteenth century shows that a keen enjoyment of natural scenery had come to be not uncommon with the more cultivated men of the time, and that a disposition was growing to speak slightingly of the beauty of gardens when compared with the beauty of certain passages of natural scenery. At length, under advice of one William Kent, who had

returned from a study of the pictured landscapes of old masters in Italy, with their vistas often realistically treated, an English nobleman had the walls of his garden razed, its geometric lines obliterated, its stiff trees felled, and a stretch of partially wooded pastoral scenery laid open to view from his windows, the composition being improved by planting here and felling there. The result was so highly praised that it proved to be the setting of a fashion, and this fashion rapidly spread.

Landseer, Sir Edwin Henry, 1802–73; English painter; b. London; son of John Landseer, line engraver; excelled while a boy in the painting of animals; became a student of the Academy, 1816. Some of his best works are in the Vernon collection (National Gallery), as "Dignity and Impudence" and "Spaniels of King Charles's Breed"; others in the Sheepshanks collection at South Kensington, as "The Old Shepherd's Chief Mourner," "A Jack in Office," and "A Highland Breakfast."

Land's End. See CORNWALL.

Lands, Pub'lic. The original limits of the U. S. extended on the W. to the Mississippi River, and on the S. to the thirty-first parallel. From time to time accessions of territory were made, as set forth and illustrated in the following map and table:

AREA OF ACQUIRED TERRITORY

DATE.	Source.	Area sq. miles.
1803	Louisiana purchase	1,171,931
1821	Florida purchase	59,268
1845	Annexation of Texas	375,239
1848	Mexican cession	545,783
1853	Gadsden purchase	45,535
1867	Purchase of Alaska	570,000

Of the original territory much was unsettled, and was claimed by certain of the original states, their claims overlapping one another in a perplexing manner. As a simple method of settling these conflicting claims, those states ceded them to the U. S., and thus the U. S. became a large landowner. Each addition of territory has added to the Government's land holdings, with the exception of Texas.

The policy of the U. S. in disposing of its public lands has been to use them to aid in the extension of settlements and the development of its domain rather than for purposes of profit. Accordingly, liberal homestead and preëmption laws have been enacted, by which actual settlers can obtain land for little more than the cost of surveying it; grants have been made to railways to enable them to extend their lines into unsettled regions, and donations have been made for educational purposes. Apart from special grants, the public lands have been acquired by individuals in the following ways: (1) Under the Homestead Act, by which a tract of 80 acres at $2.50 an acre (called double minimum land), or 160 acres at 25 cents, may be obtained through the payment of certain fees and commissions, ranging from $7 to $34, on condition that the applicant reside on and cultivate the land for five years; (2) under the Preëmption Act, through which a person may, by entering at the appropriate land office a tract of 80 or 160 acres, secure a right to take the land at Government rates whenever it may be offered for sale (repealed in 1891); (3) by auction, whenever offered by proclamation of the President or by public notice from the General Land Office at Washington; (4) after a failure to sell by auction, the lands remain subject to purchase by what is called private entry at any subsequent period; (5) by timber culture, or planting trees on 10 acres, one may obtain a patent for 160 acres free, at the end of three years (repealed in 1891); (6) by providing means of irrigation, settlers may take up a full section, 640 acres, of desert land.

Land Tax. See TAXATION; SINGLE TAX.

Land Ten'ures. See FEUDAL SYSTEM; FOLKLAND.

Lane, Edward William, 1801–76; English Orientalist; b. Hereford; was employed for many years in preparing an Arabic lexicon and thesaurus, the first and second parts of which were published; is widely known by his translation of the "Arabian Nights," his "Manners and Customs of the Modern Egyptians," and his Arabian and Eastern tales.

Lane, Joseph, 1801–81; American military officer; b. Buncombe Co., N. C.; removed in youth to Indiana, where he engaged in business and politics; served as colonel of the Second Indiana Volunteers in the Mexican War, and was made a brigadier and brevet major general for gallantry at Buena Vista and in many minor actions; became, 1848 and 1853, Governor of Oregon Territory; was a delegate in Congress, 1851–59; U. S. Senator, 1859–61; and, 1860, was nominated for Vice President on the Breckinridge ticket.

Lane-Poole, Stanley, 1854– ; English historian and archæologist; b. London; prepared the official catalogue of the Oriental coins in the British Museum, eight volumes, 1875–83; on death of his great-uncle, Edward William Lane, he undertook the completion of his Arabic lexicon, and brought out the sixth, seventh, and most of the eighth volumes, 1877–89; Prof. of Arabic in Trinity College, Dublin, after 1898. His numerous works include "Essays in Oriental Numismatics," 1872–77; "Arabian Society in the Middle Ages," 1883; "Social Life in Egypt," 1883; "The Moors in Spain," 1886; "Turkey," 1888; "The Barbary Corsairs," 1890; the last three in the "Story of the Nations Series."

Lanfranc (lăn'frănk), abt. 1005–89; English prelate; b. Pavia, Italy; was for many years a Prof. of Jurisprudence in that city; removed to France; taught at Avranches; in 1042, entered the abbey of Bec, Normandy, where his school was visited by many scholars. In 1063 he became Abbot of St. Stephen, and, 1070, Archbishop of Canterbury. He rebuilt the cathedral, founded two opulent hospitals outside the city, and employed his great influence with the Conqueror in the support of justice

LAND ACQUIRED
BY THE
UNITED STATES
SCALE OF MILES
DOMINION OF CANADA
LOUISIANA PURCHASE
NORTHWEST TERRITORY
ORIGINAL UNITED STATES
ANNEXED IN 1845
FIRST MEXICAN CESSION 1846
SECOND MEXICAN CESSION 1853
LINE OF 1846
LINE OF 1819
Title acquired by Discovery, Exploration and Settlement. Title acknowledged by Great Britain 1846
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
ALASKA
PACIFIC OCEAN
Long. West from Green wich
Long. East
Longitude West from Washington

and the protection of the natives, but seconded William in the line of action which finally subordinated York to Canterbury, and in the gradual replacement of English prelates and abbots by foreigners.

Lanfranco (lăn-frăn'kō), **Giovanni**, 1581–1647; Italian painter; b. Parma; studied with Agostino Caracci, and, after his death, with Annibale Caracci, who entrusted him with the cartoons for the Farnese Palace in Rome; also etched the greater part of the Loggia of the Vatican. After the death of Annibale Caracci he returned to Parma and Piacenza, where he developed an individual style of painting. His most famous oil paintings are "St. Andrea Avellina," at Rome; the "Dead Christ," at Bologna, and "St. Roch" and "St. Conrad," at Piacenza. He painted the cupolas of St. Andrea della Valle and the Church of Jesus at Rome.

Lanfrey (lăñ-frā'), **Pierre**, 1828–77; French historian; b. Chambéry, Savoy; served in the Mobiles of Savoy during the Franco-German War; was elected to the National Assembly, 1871; minister to Switzerland, 1871–73; elected life senator, 1875. Author of "The Church and the Philosophers of the Eighteenth Century," "An Essay on the French Revolution," "The political History of the Popes," "The Restoration of Poland," "History of Napoleon I," the ablest and most complete arraignment of the first empire at the bar of history that has appeared.

Lang, Andrew, 1844– ; British author; b. Selkirk, Scotland; gained a fellowship at Merton College, Oxford, and lived at Oxford until he was thirty; then removed to London, and became a contributor to periodicals. His first book, "Ballads and Lyrics of Old France," appeared, 1872; the first to give him fame, "Ballads in Blue China," 1880. His many subsequent works include a number of fairy tales for children, "Custom and Myth," "Rhymes à la Mode," "Books and Bookmen," "Letters to Dead Authors," "Angling Sketches," "Homer and the Epic," "Pickle the Spy," "The Book of Dreams and Ghosts," "The Making of Religion," "A History of Scotland," "Myth, Ritual, and Religion," "Prince Charles Edward," "Magic and Religion," "Alfred Tennyson," "Essays in Little," "Adventures among Books," "John Knox and the Reformation." He is joint editor of translations of the "Odyssey" and "Iliad."

Lang'don, John, 1741–1819; American legislator; b. Portsmouth, N. H.; became a successful merchant; was sent to the Continental Congress, 1775; became navy agent, Speaker of the New Hampshire Assembly, and Judge of the Common Pleas, 1776. He gave the money with which Gen. Stark's famous brigade was equipped; in person commanded a company at Bennington, Saratoga, and elsewhere; was president of the New Hampshire Convention and continental agent, 1779; sent to Congress, 1783; was afterwards several times Speaker in the New Hampshire Legislature. He was president of New Hampshire, 1785; member of the convention which drafted the Federal Constitution; governor, 1788, 1805–09, and 1810–12; U. S. Senator, 1789–1801.

Lange (läng'ĕh), **Johann Peter**, 1802–84; German theologian; b. Sonnborn, near Elberfield, Prussia; appointed Prof. of Theology at Zurich, 1841, and at Bonn, 1854; chief works are "Life of Jesus," "Christian Dogmatics," "History of the Church," and the great "Commentary on the Bible," edited and partly written by him.

Langendijk (läng'ĕn-dĭk), **Pieter**, 1683–1756; Dutch poet and playwright; b. Haarlem; son of a mason; became a designer in a damask factory at The Hague; followed the same trade at Amsterdam, and, after 1722, at Haarlem. His works include the comedies, "Don Quixote," "The Braggart," "The Mutual Marriage Deception," "The Mathematicians," "Xantippe," and "A Mirror of Our Merchants," some of which are still played on the Dutch stage.

Langensalza (läng'ĕn-zält-sä), town of Prussia, province of Saxony; 13 m. N. by W. of Gotha. On February 15, 1761, the allied Prussians and British, under Sydow and Spörcken, defeated here the German imperial army under Steinville; April 17, 1813, the Prussians defeated the Bavarians; June 27, 1866, a bloody contest took place between the Prussians and the Hanoverians, in which the latter were victorious, but suffered so heavily that a few days after they were forced to surrender to the Prussians, who were strengthened by reinforcements. Pop. (1900) 11,926.

Langevin (läñzh-văñ'), **Sir Hector Louis**, 1826–1906; Canadian statesman; b. Quebec; admitted to the bar, 1850; member Executive Council of Canada, 1864–67; Secretary of State of the Dominion, 1867–69; Minister of Public Works, 1869; Postmaster-General, 1878–79; Minister of Public Works, 1879–91. During the absence of Sir John Macdonald, 1885–86, Langevin, as senior minister in the House of Commons, acted as leader of the government; knighted, 1881; retired, 1891. Author of "Institutions of Canada," etc.

Langevin, Jean François Pierre La Force, 1821–92; Canadian prelate; b. Quebec; brother of Sir Hector Louis Langevin; was ordained, 1844; consecrated Bishop of St. Germain de Rimouski and titular Archbishop of Leontopolis, 1867; Prof. of Higher Mathematics in the Seminary of Quebec, 1840–49; principal of Laval Normal School, 1858–69; founded the College of Rimouski, 1870; L'Hospice des Sœurs de la Charité, 1872, and Les Sœurs des Petites Écoles, 1874; constituted a Roman count, and assistant to the apostolic throne, 1886.

Lang'land, Lange'lande, or Long'land, William, abt. 1332–1400; English author; b. probably at Cleobury Mortimer, Shropshire. His "Vision of Piers Plowman," in alliterative verse, written abt. 1362, was a religious and moral allegory, containing much satire on ecclesiastical corruption and the social abuses of the time. To this he added a continuation,

"Vita Do Wel, Do Bet and Do Best." Abt. 1377 the whole was greatly enlarged by the author.

Langles (läṅ-glās'), **Louis Mathieu,** 1763–1824; French Orientalist; b. Perenne; translated from the Persian the "Political and Military Institutes," supposed to have been written by Tamerlane in Mongol; published the Manchu-French lexicon of Father Amiot; promoted the establishment of the Geographical Society and of the special School of Oriental Languages; was the first administrator of the latter, taught Persian there, and by his enthusiasm and liberality contributed greatly to the extension of Oriental studies.

Lang'ley, Samuel Pierpont, 1834–1906; American scientist; b. Roxbury, Mass.; was appointed assistant Prof. of Astronomy in the U. S. Naval Academy, 1865; became director of the observatory at Allegheny, 1867; devoted himself principally to observations on the sun, especially to the measurement of the heat of the sun and moon. He invented the bolometer, one of the most delicate instruments known for the measurement of radiant heat; received the gold medal of the Royal Astronomical Society of London, and the Rumford medal both from the Royal Society and from the American Academy of Arts and Sciences; succeeded Prof. Baird as secretary of the Smithsonian Institution, 1887. He published investigations into the dynamics of the atmosphere and the flight of birds, with especial reference to the possibility of aërial locomotion, and in his last few years chiefly applied himself to the construction of a flying machine.

Langlois (läṅ-glwä'), **Victor,** 1829–69; French Orientalist; b. Dieppe; studied Oriental languages and traveled, 1852–53, in Cilicia and Armenia, where he discovered over eighty new Greek inscriptions, and undertook excavations at Tarsus, from which he removed many interesting antiquities to Paris. In 1867 he published "Le Mont Athos et ses Monastères," containing a photolithographic reproduction of the geographical work of Ptolemy; 1868, began the publication of "Collections des Historiens Anciens et Modernes de l'Arménie," which was unfinished when he died.

Lang-Son', city of Tonkin, 100 m. NE. of Hanoi, and 12 m. from the Chinese frontier; capital of a district of the same name. Its occupation, 1885, by the French followed the bloody battles of Lac-nanh and Song-thuong. It is an ancient city, well fortified, a center for trade in opium, oil of anise, and coarse cotton cloths.

Lang'ton, Stephen, abt. 1160–1228; English prelate; b. Devonshire, Lincolnshire, or Sussex; studied in Paris, and became there canon of Notre Dame and chancellor of the university; was made a cardinal, 1206, by his former fellow student, Innocent III, and, 1207, was consecrated Archbishop of Canterbury. In 1213 he joined the barons opposed to the misgovernment of John, and his name stands first among the subscribing witnesses to Magna Charta. For his refusal to excommunicate the barons at the command of Innocent, he was suspended from the exercise of his archiepiscopal functions till 1216. He again placed himself, 1223, at the head of the barons to demand from Henry III the confirmation of their liberties. His writings have perished, but to him is due the division of the Bible into chapters.

Lan'guage, primarily, utterance by the tongue, that being the most active and essential of the articulating organs. It is in accordance with this that we use the word; it denotes articulate utterance for the expression of thought; but this also in two ways. First, we mean by *language* the general power or faculty of expression of thought by articulate utterance, a power possessed and exercised by all normally constituted and circumstanced human beings (not by the deaf nor by the solitary); in this sense, speech is its common synonym. Second, we mean a particular body of articulate utterances, signs for thought, used in some definite community, present or past, as their means of expression, intelligible between members of that community, but not to outsiders. The science of language (also termed "comparative philology" and "comparative grammar") inquires into the origin of language; into the laws of the development of all languages; into the reasons of the diversities or similarities of languages; into the causes of the grammatical and syntactical constructions peculiar to each; and into the relations which languages hold to each other.

Many authorities hold that man was originally speechless, and some have attempted to explain the origin of language after the Darwinian theory of development. The ancients held the theory that words were originally formed by imitations of natural sounds, and called this principle of coining words *onomatopœia*—word making. Of course it is not maintained that all current words are to be explained on this principle alone. It is maintained only that the original stock of which language was made up consisted of such roots, and that a large proportion of them, after the changes of thousands of years, bear their origin distinctly on their face. Over three hundred distinct articulations have been recorded, but no single language uses more than a fraction of these; some have only a dozen articulations, while Sanskrit and English each possess near fifty. Some languages allow only one consonant in a syllable, while English has such difficult combinations as *strands, twelfths.* Some, as Chinese, admit only words of one syllable, while American Indian languages count the syllables by the score.

The changes of language are seen in (1) alteration of old material; (2) loss of material; (3) additions of new material. Ease of utterance is produced by omission or contraction, a process particularly marked in English, in which the monosyllables, which form about three quarters of our current speech, were all of them words of two or three syllables in its earlier history. Words change their meaning by restriction and by extension. Board is made to signify the "table," and then the food set on it, and then the body of men that sit around it. All our expressions for intel-

lectual and moral conceptions and relations are obtained thus from terms originally indicative of what is physical and sensible; thus right is "straight," and wrong is "wrung" or "twisted," understand is "stand in the midst" of anything, imply is "fold in," apply is "fold to," reply is "bend back," comply is "bend along with," develop is "unwrap," occur is "run against," apprehend is "take hold," and so on.

A word is lost when the conception for which it stood dies out of men's remembrance, as the phraseology of ancient religion and ancient art, when these are superseded by new. External additions to language come from borrowing from abroad or from the development of native material. Only those languages borrow on a large scale of which the speakers have derived to a large extent their culture, knowledge, institutions from other communities. The Persian in this way gets material of expression indefinitely from the Arabic; the Turkish, from the Persian and Arabic; the modern dialects of India, from the Sanskrit; the Japanese, from the Chinese. So also all the peoples who inherit Greek and Roman civilization have taken abundantly from the Greek and Latin vocabularies. Names of things are most easily and directly borrowed, connectives least easily, grammatical inflections, etc., almost not at all.

The world is full of dialects (at least 5,000), akin to one another, others apparently unrelated. If speech began to exist with a single race or a limited number of races of human beings, and spread with them from land to land and from continent to continent, ever altering and becoming more different from each other with every new division of a race or community, the result would finally be what we see it to be. In the long ages of barbarism the growth of dialects was the prevailing tendency; since civilization has become the overwhelming force in the history of the world, the tendency is the other way; the cultivated dialects of the leading nations are extending, and crowding out diversity, and men may look forward to a time when a few languages will prevail universally.

Various divisions of speech have been proposed by different authorities, as languages without grammatical structure, languages that make use of affixes, and inflectional languages; monosyllabic languages, languages with monosyllabic roots admitting of composition, languages of dissyllabic verbal roots, and polysynthetic or polysyllabic languages, etc.; but these distinctions seem to be groundless. To all appearances, groups of languages, though clearly and closely related, indicate more than a single type, and are not surely to be derived from a single primitive tongue, excepting perhaps the languages spoken by the Kaffirs and Malays and, but less probably, those of the Papuans and Australians. All other groups seem to be polyglottic, or derived from several root forms of speech in no manner related. It has therefore been attempted to attain a less objectionable classification by combining the results of linguistic and ethnological researches. The following table is based on the results obtained by Prof. Max Müller:

I. Papuan languages. Papua, Sunda Islands, and Philippines.
II. Hottentot languages.
III. Kaffir or Bantu languages.
IV. Negro languages. 1. Mande languages. 2. Volof languages. 3. Felup languages. 4. Bijogo. 5. Banyum. 6. Nalu. 7. Bulanda. 8. Limba. 9. Landoma. 10. Soarhal. 11. Houssa. 12. Borneo languages. 13. Kru languages. 14. Eva languages. 15. Ibo languages. 16. Mbafu. 17. Mitchi. 18. Musgu languages. 19. Baghirmi. 20. Maba. 21. Nile languages.
V. Australian languages, including Tasmanian languages.
VI. Malayo-Polynesian languages. 1. Melanesian languages: Fiji Islands, etc. 2. Polynesian languages. *a.* Samoa, Maori, Tahitian, Hawaiian, etc. 3. Malayan languages. *a.* Tagala group: 1, Philippines; 2, Ladrones; 3, Malagasi. 4. Formosa *b.* Malayo-Javanese group.
VII. Turanian or Mongolian languages. 1. Uralo-Altaic languages. *a.* Samoyedic. *b.* Finnic, including Suomi, Magyar, etc. *c.* Tartaric, including Turkish, etc. *d.* Mongolic. *e.* Tungusic, including Japanese, Korean, etc. 2. Monosyllabic languages (so named for convenience): Chinese, etc.
VIII. Languages of the Arctics. 1. Yukagir. 2. Koriak, Tchuktchi. 3. Kamtchatka and the Kurile Islands (Aino). 4. Yenisei-Ostiaks and Kotts. 5. Eskimos. 6. Aleutians.
IX. American languages. 1. Kenai languages. 2. Athabascan languages. 3. Algonquin languages. 4. Iroquois languages. 5. Dakota language. 6. Pani. 7. Appalaches languages. 8. Languages on the N. W. coast. 9. Oregon languages. 10. Californian languages. 11. Yuma languages. 12. Isolated languages of Sonora and Texas: language of the Pueblos. 13. Isolated languages of Mexican aborigines. 14. Aztec languages. 15. Maya languages. 16. Isolated languages of Central America and the Antilles. 17. Caribbean languages. 18. Tupi languages. 19. Isolated languages of the Andes. 20. Araucanian. 21. Guayeuro-Abiponian. 22. Puelche. 23. Tehuelhetic. 24. Pesharah 25. Chibcha. 26. Quichua languages.
X. Dravidian languages. 1. Munda languages. 2. Dravida languages: Tamil, etc. 3. Cingalese (Elu).
XI. Nubian language. 1. Foolah languages. 2. Nuba languages.
XII. Languages of the Mediterranean races. 1. Basque. 2. Caucasian languages. *a.* Lesghian, Avar, Kasikumuk. *b.* Circassian, Abkhasian. *c.* Kists (Tush). *d.* Georgian, Lazich, Mingrelian, and Suanian. 3. Semitic languages. *a.* Hamitic languages: 1, Libyan group (Ta-Masheg); 2, Ethiopic group (Bedja, Somauli, Dankali, Galla); 3, Egyptian group (ancient and modern Egyptian or Coptic). *b.* Semitic languages: 1, N. group—Chaldee, Syriac, Hebrew, Samaritan, Phœnician; 2, S. group—Ethiopic, Tigre, Amharic, Himyaritic, Arabic. 4. Aryan or Indo-European languages. *a.* Indian group: 1, old Indic (Sanskrit), Pali, Prakrit; 2, modern Indian languages—Bengali, Assami, Oriya, Nepaulese, Cashmerian, Sindhi, Punjabi, Hindustani, Gujarati, Marathi; 3, languages of the Siljaposh, Dardu tribes, and gypsies. *b.* Iranian group: 1, old Persian, Pehlevi, Parsi, modern Persian and its dialects, Kurdish, Beluchi; 2, Zend, Afghan; 3, Ossetian; 4, Armenian. *c.* Celtic group: Welsh, Gaelic. *d.* Italic group: Etruscan (?), Umbric, Oscan, Latin, and the Romance languages (Italian, Spanish, Portuguese, French, Rhæto-Romanic, Rouman). *e.* Thraco-Illyrian group: Albanese. *f.* Greek group: ancient and modern Greek. *g.* Letto-Slavic group: 1, Slavic languages—old Slavic, Bulgarian, Serb, Slovenish, Russian, Polish, Polabic, Bohemian; 2, old Prussian languages—Lithuanian, Lettish. *h.* Germanic languages: Gothic, High German, Low German, Anglo-Saxon, English, Frisian, Flemish, Dutch, Icelandic, Swedish, Danish.

See AGGLUTINATE LANGUAGES, DIALECTS, UNIVERSAL LANGUAGES.

Languedoc (lăn-gē-dŏk'), one of the old provinces of France; bounded S. by the Mediterranean and E. by the Rhone; bore while a Roman province the name of Gallia Narbonensis; passed from the Romans to the Goths,

from the Goths to the Saracens, and from the Saracens to the Counts of Toulouse; 1271, was finally annexed to the French crown. Christianity was introduced from Greece through Marseilles and Lyons, but from the very beginning the clergy complained of the peculiar predisposition the people showed for heresy. Languedoc was the chief seat of the Cathari, and afterwards of the Canisards. It is now divided into the departments of Ardèche, Aude, E. Pyrenees, Upper Garonne, Gers, Hérault, Lozère, Tarn, and Tarn-et-Garonne. The chief city of Languedoc was Toulouse.

Lanier (lăn'ĭ-ẽr), **Sidney,** 1842–81; American poet; b. Macon, Ga.; served in the Confederate army during the Civil War; afterwards taught school and practiced law in Alabama and Georgia; removed to Baltimore, Md., 1873; was lecturer on English literature at Johns Hopkins Univ. from 1879 till his death; was a practical musician, and applied musical principles to poetry in his "Science of English Verse"; wrote the cantata sung at the Centennial Exposition of 1876; published "The English Novel," and edited for boys Froissart's "Chronicle," the "King Arthur," the "Mabinogion," and Percy's "Reliques." A complete edition of his poems was published, 1884.

Lanjuinais (läṅ-zhwē-nā'), **Jean Denis,** 1753–1827; French jurist and statesman; b. Rennes; became Prof. of Ecclesiastical Law in his native city, 1775; was elected a Deputy to the States General, 1789. As a member of the convention he sided with the Girondists, but opposed the more radical measures of the Jacobins, and in the case of the king advocated banishment instead of the death penalty. In 1793 he was arrested, but escaped to Rennes, and, 1795, after the fall of the terrorists, resumed his seat. During the Directory he was a member of the Council of Ancients, and of the Senate during the consular rule, when he opposed the monarchical tendencies of the government of Napoleon. He was made a peer of France by Louis XVIII, and advocated liberal principles during the restoration. Among his more important writings are "Constitution of the French Nation," "Municipal Organization in France."

Lank'ester, Edwin, 1814–74; English scientist; b. Melton, Suffolk; became a lecturer at St. George's School of Medicine, 1843; secretary of the Ray Society, 1844; Prof. of Natural History at New College, London, 1850; president of the Microscopical Society, 1859. He acquired wide fame as a lecturer and writer on sanitary and social science, physiology, botany, zoölogy, foods, microscopy, etc.; was author of numerous books on those subjects, mostly designed for popular use, and after 1866, edited *The Journal of Social Science.*

Lankester, Sir Edwin Ray, 1847– ; English zoölogist; b. London; son of the preceding; was Prof. of Zoölogy and Comparative Anatomy in University College, London, 1874–90; and Linacre Prof. of Comparative Anatomy and fellow of Merton College, Oxford, 1891–98; director of the natural-history departments of the British Museum after 1898. He devoted particular attention to the structure, development, and classification of invertebrates, and was the author of the articles "Mollusca" and "Protozoa" in the Encyclopædia Britannica. Among his other works are "Fishes of the Old Red Sandstone," "Comparative Longevity," "Degeneration," "The Advancement of Science." After 1869 he was editor of *The Quarterly Journal of Microscopical Science,* besides contributing numerous articles.

Lannes (lăn), **Jean,** 1769–1809; French military officer; b. Lectoure, Guienne; followed Napoleon to Italy as a volunteer, 1796; became a brigadier general, 1797; accompanied Napoleon to Egypt, 1798; general of division, 1800, and commander of the Consular Guard. He led the vanguard when in the same year the army crossed the Alps and gained the victory of Montebello. On the establishment of the empire he was made a marshal. He compelled the surrender of Saragossa, 1809, after which Napoleon created him Duc de Montebello. Died of injuries received at the battle of Aspern.

Lans'downe, Henry Petty-Fitzmaurice (third Marquis of), 1780–1863; b. London; second son of William Petty, first Earl of Shelburne, who in 1784 was created Marquis of Lansdowne. Educated at Westminster School and at Edinburgh; graduated at Trinity College, Cambridge, in 1801, and under the name of Lord Henry Petty was chosen as a Whig in 1802 to a seat in Parliament for the Borough of Calne; elected member for the Univ. of Cambridge in 1806, and in the same year became Chancellor of the Exchequer in the ministry of Grenville and Fox, retiring in 1807. On the death of his elder brother, in 1809, he succeeded to the title, and became one of the heads of the Liberal party in the House of Lords, being an early advocate of Catholic emancipation, the abolition of slavery, Parliamentary reform, and free trade. On the return of the Whigs to power, in 1827, he became Secretary of the Home Department, under Canning; Secretary of Foreign Affairs, under Lord Goderick, 1828; Lord President of the Council, under Earl Grey, from November, 1830, to November, 1834; under Lord Melbourne, from April, 1835, to September, 1841, and under Lord John Russell, from July, 1846, to February, 1852.

For many years he had been the Liberal leader in the upper house; resigned that position in 1852, but in December, on the formation of the Aberdeen Ministry, he consented to take a seat in the Cabinet without a portfolio, and again in the first Palmerston Ministry, February, 1855, to February, 1858. He formed a splendid library and collection of art treasures, was a patron of literature, and made Lansdowne House the center of polite society in England. He was a trusted adviser and friend of the queen, but refused a dukedom and the premiership.

Lan'sing, capital of the State of Michigan, and of Ingham County; at the junction of the Grand and Cedar rivers; 88 m. NW. of Detroit; derives good water power from the rivers,

which are here crossed by ten bridges; has important manufactures; and is the center of an excellent farming region. In and near the city are the State Capitol, U. S. Govt. Building, City Hall, State Industrial School for Boys, State School for the Blind, State Agricultural College, and State Hospital. The manufactures include gas and gasoline engines, cream separators, agricultural implements, sleds, stoves, carriages, road carts, wheelbarrows, pressed stone, condensed milk, beet sugar, cut glass, beer, flour, knit goods, and machinery. Pop. (1904) 20,276.

Lanta'na, genus of mostly tropical shrubs of the family *Verbenaceæ*. Many have stimulant and aromatic qualities. *L. pseudothea* is highly esteemed in Brazil as a substitute for tea. A number of the species are beautiful greenhouse shrubs, notably *L. camara* and *mixta* of tropical America. The U. S. have at least two species native to the Gulf States—*L. camara* and *involucrata*.

Lan'thanum, one of the chemical elements of rare occurrence, discovered in 1839. It occurs in several rare minerals in Norway, as cerite, gadolinite, and allanite. Lanthanum forms an oxide of the formula La_2O_3, analogous to that of aluminum; atomic weight, 138.

Lanzarote (lăn-thä-rō'tä), one of the Canary Islands; area, 325 sq. m.; rises to the height of 2,000 ft.; contains several active volcanoes; is very fertile; produces the finest grapes and wines on the Canaries, but is much exposed to drought; Teguise is the capital, Arrecife the principal port; pop. (1897) 17,-290.

Lanzi (lăn'zē), **Luigi**, 1732–1810; Italian author; b. Monte dell' Almo; became a Jesuit; was Prof. of the Humanities in several colleges; and on the suppression of the Jesuits, 1773, was appointed assistant director of the Gallery of Florence. In 1790 he was appointed archæologist of the grand duke. His works include "Essay on the Etruscan Language" and "History of Painting in Italy." No general history of Italian painting had previously appeared, and Lanzi's work was the first comprehensive treatise in which the history of each school is given according to its several epochs.

Laocoön (lā-ŏk'ō-ŏn), Trojan patriot and priest who opposed the introduction of Sinon's wooden horse into the city of Troy. He almost defeated the plans of the Greeks, and thereby aroused the anger of Athene, who loved the Greeks because she hated Paris. When Laocoön was sacrificing, Athene sent from Tenedos two huge serpents, which killed Laocoön and his two sons. His myth is variously given, but the account in Virgil's "Æneid" is the best known. The death of Laocoön and his sons is the subject of a noble group now existing in the Vatican. It was executed by Agesander, Athenodorus, and Polydorus, Rhodian artists, who probably lived in the time of Titus.

Laodamia (lā-ŏd-ā-mī'ä), mythical Grecian princess, daughter of Acastus and wife of Protesilaus, a Thessalian hero, who in the siege of Troy was the first Greek slain on the Asian shore. She entreated the gods to permit her to hold converse with her husband for only three hours, and Mercury conducted Protesilaus back to the upper world; but when he was forced to return, Laodamia expired.

Laodicea (lā-ŏd-i-sē'ä), in ancient geography, the name of six Greek cities in Asia, situated in Phrygia, Syria, Lycaonia, Cœle-Syria, Media, and Mesopotamia, founded by Seleucus Nicator, the first king of Syria, and some of his successors. Two deserve particular notice: LAODICEA ON THE LYCUS, a tributary of the Meander, in the SW. corner of Phrygia; received its name from Laodice, the Queen of Antiochus Theos, its founder. Under the Romans, though frequently visited by destructive earthquakes, it became one of the most opulent cities of Asia Minor. It was destroyed, 1402, by Tamerlane. Paul addressed an epistle to the Christians of Laodicea, commonly supposed to be lost; but some think that the so-called Epistle to the Ephesians was really written to the Laodiceans. The town of Eski-Hissar is built on its site.—LAODICEA ON THE SEACOAST, a city of Syria, 50 m. S. by W. of Antioch, founded by Seleucus Nicator, and named after his mother. It was renowned for its wine, its splendor, and the excellence of its harbor. Herod the Great built an aqueduct, the ruins of which remain. Its site is now occupied by Latakia.

Laom'edon, in Greek mythology, the father of Priam and Hesione, and King of Troy. Apollo and Poseidon built the walls of Troy for a specified reward, which Laomedon refused them after the completion of the work. Thereupon Apollo sent a plague and Poseidon a sea monster to distress the land, which, according to an oracle, might only then gain rest when Hesione had been offered up to the sea monster. Heracles went to Troy on his return from the land of the Amazons just at the time when Hesione had been chained to a rock to await the coming of the monster, and offered to rescue her in return for the horses given by Zeus to Tros after the rape of Ganymede. Once again Laomedon declined to keep his word. Heracles made war on him, captured Troy, and killed Laomedon along with all his sons except Priam.

Laon (lä-ōn'), fortified town of France; the ancient *Lugdunum Clavatum*, the *Bibrax* of Cæsar; capital of the department of Aisne; 87 m. NE. of Paris. Its Gothic cathedral is one of the most beautiful creations of the art of the twelfth century. This ancient city was the scene of an ecclesiastical council, 948, was memorable in the Hundred Years' War, the wars of Napoleon I, and in the Franco-German War of 1870, having capitulated to the Germans September 9th. Pop. (1901) 9,613.

Laos (lä'ōs), people of central Indo China. They are nearly related to the Siamese, and call themselves Thai or Thaiyai (ancient Thai), while the Burmans call them Shans. They are somewhat civilized, though still often

in tribal relations, while there are certain uncivilized tribes of them called Lava. In religion they are Buddhists. Their language resembles that of the Siamese. They belong in part to Siam (the Siamese Laos), in part to NE. Burma (the Shan states), and are found in large numbers in Tonking and Annam.

Lao-tse (lä'ō-tsĕh), or **La'o-tsŭ** (literally, "old boy or venerable philosopher"), sometimes also LAO-KIUN (literally "venerable prince"); b. abt. 604 B.C.; Chinese philosopher, the reputed founder of Taoism; b. Kiuh-jiu, Honan, or perhaps in Nganhwei. Little is known of him except that he was state librarian and keeper of the imperial archives at Loyang, the capital of Chow. After passing the age of eighty-five he withdrew to the West, and there wrote "Tas-teh-king" (literally, "Classic of the Way and of Virtue"). The date and place of his death are unknown.

Laparot'omy, operation in which the abdominal cavity is opened; is a surgical procedure first performed by an American physician, Dr. Ephraim McDowell, 1809, but it did not gain general popularity with physicians until recent years. Laparotomy is applied in all cases where surgical diseases of the organs of the pelvis or abdomen require direct treatment or removal. It consists in the careful opening of the abdomen, generally through the middle line of the body. Since the introduction of aseptic methods in surgery the former danger from internal operation has largely disappeared.

La Paz (lä päth'), city of Bolivia, capital of department of La Paz, and seat of government of the republic, at an elevation of 12,226 ft., on both sides of the river Chuqueapo. Well built, with an agreeable climate, and beautifully situated, its promenade or *alameda* presents a splendid view of the Illimani, and is said to be the finest in Bolivia. It was founded, 1548; is the chief commercial city of Bolivia, transacting a large foreign trade with the Peruvian ports. It has a beautiful cathedral, a university, schools of law, medicine, theology, and science, and has frequently been the seat of the national government. Pop. (1906) 67,235.

La Paz, capital and principal town and port of the territory of Lower California (Baja California), Mexico; on La Paz Bay, Gulf of California; is built in the typical Mexican fashion; inhabitants mainly engaged in gold and silver mining in the surrounding region. The pearl fisheries of the bay, once famous, have greatly declined; the divers employed in the work are Yaqui Indians. Pop. (1895) 4,737.

La Pérouse (lä pā-rōz'), **Jean François de Galaup** (Count de), 1741–abt. 1788; French navigator; b. near Albi; served in the American war of independence, and, 1782, entered Hudson Bay with a small fleet and destroyed the British trading establishments there. He was appointed by Louis XVI to the command of an expedition for exploring the Pacific; sailed from Brest, 1785, doubled Cape Horn, and proceeded to the NW. coast of America. From Mt. St. Elias he explored the coast as far as Monterey, Cal., whence he crossed over to Asia. In 1787 he followed the coast from Manila to Petropavlovsk, and discovered the straits between the islands of Saghalien and Yezo which bear his name. Sailing S., he touched at Manua, one of the Samoan islands, and thence proceeded to Botany Bay, where he was last heard of in February, 1788. D'Entrecasteaux's expedition (1791) sought for him in vain. Abt. 1828 Dumont d'Urville learned that he had probably perished by shipwreck at Vanikoro, an island of the New Hebrides group in the S. Pacific. No further facts of the fate of the explorers have ever been learned, but a few relics of the party were discovered on Vanikoro, 1898.

Lap'ham, Increase Allen, 1811–75; American physicist; b. Palmyra, N. Y.; was an engineer on the Welland and other canals; settled at Milwaukee, 1836; and became state geologist of Wisconsin, 1873. In 1869 he suggested in a memorial to Congress the system of weather reports, afterwards adopted. He published "Wisconsin; its Geography, Topography, History, Geology, and Mineralogy" a "Geological Map of Wisconsin," and "Antiquities of Wisconsin."

Lap'idary, workman whose trade is the cutting and polishing of small ornamental stones. His apparatus consists almost exclusively of wheels or disks for grinding down, slitting, and polishing the faces of minerals. These are of a few inches diameter, made of lead, pewter, brass, or iron, and of various soft alloys, and some used for smoothing the softest minerals are of willow or mahogany. The metal wheels are called laps. The term mill is applied to them all, and some are distinguished as slitting mills, others as roughing, smoothing, or polishing mills, of all which there are varieties adapted to the different degrees of hardness of the minerals. The mills are fed with moistened diamond powder or emery and water; the soft substance of the disks, in which the powder becomes imbedded, thus serving merely as the medium for holding the abrading material. The diamond powder used is made from *bort* or imperfect coarse diamonds, and sells at from 75 cents to $3 per carat. The various disks used by the lapidary are adjusted to a vertical spindle, so as to revolve horizontally just above the surface of the table. They are usually driven by hand. In the E. Indies wheels and rubbers are made of corundum or emery imbedded in lac resin. The wheels are placed on a horizontal axis, which is made to revolve by a bowstring. The finest cutting of precious stones is done in New York, London, and Paris, and in the Jura; of semiprecious stones, in Paris and the Jura.

La'pis Laz'uli, natural silicate of lime and alumina, with a small amount of sulphurets, crystallizing in the monometric system, and of a beautiful Berlin-blue color. It is highly valued for ornamental articles, and was formerly the sole source of the rich paint ultramarine, which is now chiefly made artificially.